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AND

JOURNAL FOR RECORDING FACTS & ANECDOTES

RELATING TO

QUADRUPEDS, BIRDS, REPTILES, FISHES, ANNELIDES,
INSECTS, WORMS, ZOOPHYTES, &c.

THEIR HABITS, FOOD, RETREATS, OCCASIONAL APPEARANCE,
MIGRATIONS, NESTS AND YOUNG.

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Proceedings of Natural-History Collectors in Foreign Countries.

Mr. H. W. Bates.* — "Santarem, March 10, 1853. — The collection I now send, small in bulk, but numerous in minute species, will, I hope, reach you safely and in good condition. The unusually dry weather we had up to the middle of February, was unfavourable to the appearance of small Hymenoptera, Hemiptera and moths, of which, had it been otherwise, I know I could have collected great numbers, and of different species, as sent you last year, in May. My researches, which I recommenced as soon as I recovered from the effects of my Tapajos journey, since the beginning of December last have been chiefly in entirely new ground, — moist forests on banks of rivulets at two leagues distance from Santarem. I had begun to work the small Coleoptera before I received your letter of October 7, 1852, in which you recommend me to do so; and I wish to call your attention to them. You will find a number of small species of Cleridæ, curious species of Pelonium, especially one like a very small Telephorus, Platynoptera, Priocera, &c.: from what I can make out with the capital *resumé* of the 2nd vol. of Chenu, and the British Museum Catalogue, some of these must be *new.* They require *very close* searching for, most of them being very quiet, feeding on the under side of the leaves of spiny palms in swamps. There are several species of different genera of Pselaphidæ, Tyrus, Euplectus, Bryaxis and Scydmænus, which, together with other things, I find at roots of trees on the borders of swamps. I have a unique specimen of a new species of Metopias, *Gory,* with spined thorax and elytra; only one was previously known, M. curculionides, found by Lacordaire at Cayenne. I have searched closely for further specimens, at present without success. In similar localities I found all the small Trechi, Bembidia, Ægæ, Lachnophori, and small Staphylinidæ, as well as the Dyschirii and Clivina; most of the latter do not belong to the European genera, but are very different, and curious in their forms. Then there is a variety of minute Curculionidæ and Bruchi, especially of genera allied to Baris, Mecinus, &c.; all are found at flowers of various kinds. I think I have still with me double the number of species now sent, which, by degrees, I shall sort out and remit. All these things follow pretty much the same rule as the larger Coleoptera; that is, individuals are not numerous, but species of endless diversity. There are

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* Communicated by Mr. S. Stevens.

BRITISH MUSEUM

many small Buprestidæ too, many very pretty yellowish Lebiæ and Dromii; the species of these have a very similar facies, but are very distinct, especially in the form of the thorax. There are some pretty longicorns, Ibidoin, Necydalis, Chrysoprasis &c. The butterflies are few, only two or three species of Erycinidæ and Theclæ, *very* remarkable. The series of handsome Pepsis, even if not new, will perhaps please Messrs. F. Smith and Baly, as I have been careful to select very fine and perfect specimens. In the other box, one side has a number of duplicate specimens for myself, which I shall some day find useful for dissection &c. The fine Chlænius appears to be almost spoiled from the oil which exudes from the body.

"I am really sorry for Mr. Wallace's loss. Had it been my case, I think I should have gone desperate, because, so far as regards the unique specimens, the journal &c., such a loss is irreparable. If he should visit the Andes, there is plenty of work to do. I have chalked out a route which I should like to undertake myself, but it must be after a visit to England. It is, to land at Guayaquil, cross the Cordillera to the settlements on the Napo, thence descending slowly this river, to make a stay at Nauta on the Upper Amazons: this is a route followed by many Spanish traders. At Nauta may be had repose, wholesome living, and good collecting: a European family resides there, one Mr. Cauper, who speaks English. What hosts of new Cybdeles, Catagrammas &c. one might expect! Thence it would not be difficult to go up the Huallaya, cross to Moyobamba, Chachapoya, to Truxillo: the great disadvantage is, that I do not see how one could forward the partial collections to England. At Nauta, if the Brazilian Government fulfils its promise, there will arrive a steamer from Parà once or twice a year; if so, it would be easy to remit to England. I intend to stay here working at the small species, until I see whether the steamer will be forthcoming for the Upper Amazons. The Barra steamer is fairly going, having made two voyages, but it is supported almost entirely by the bonus from government, as the whole freights &c. only reach one-sixth of its monthly expenses! As to getting from this place to Ega in one's own canoe or as a passenger, it is *an utter impossibility.*

"The Tapajos collection, I hope, has reached you safely ere this; I sent it November 25th. The collection of Diurnes therein was fine. I see by Mr. Hewitson's plate of Pieris, that there were three new species in the collections of this genus alone. If the Peru steamer comes it will be most likely in May and June, just the time to arrive in Ega for the rarer Cybdeles, Timetes, Eubages, Prioni, &c. As my health is quite re-established, in fact better than in England, I think it unwise to leave the country without again visiting that rich region, and indeed going up still higher after the fine Napo Catagrammas, and the short-tail monkeys (*Onakary*), which I am sure Dr. J. E. Gray would like to have a series of; especially as an opportunity offers of going up in fifteen days, it taking four months in a sailing vessel.

"I may state here that Megacephala Spixii is most certainly distinct from M. Martii, since it has its own peculiar range, soil, and habits. I have not seen a single specimen of the former at Santarem, the only place where I have seen M. Martii, in soils and localities quite distinct from those of M. Spixii, and no intermediate variations of colour have occurred. A specimen of M. spinosa? went in the collection of June last; yesterday I found a third specimen, and a series of quite a different Megacephalous larva. M. spinosa? has its peculiar habits likewise; the three specimens were all taken about mid-day, running about dry sandy *campos;* at night, I have searched the place for it without seeing one. M. curta was very common a few days ago, close to the edge of the water, on sandy beaches: it hides in the daytime in semi-aquatic retreats under stones or sediments, I never saw it five yards from the moist edge of the water. About a month ago I saw undoubtedly an Iresia running over the trunk of a tree on a sloping bank in the forest, but missed it."

"Santarem, March 30, 1853.—On the 12th instant I forwarded to you a collection and letters by a sailing vessel; I now avail myself of our steamer to write again and report progress, but most likely both letters will leave Parà by the same ship. Although my gains the last year and a half appear very small, I am not much discouraged, as my private collection is unusually fine, and two expensive voyages that I made in the time, will not occur again. I have previously stated the great difficulty in exploring out-of-the-way places, as the river Capari on the Tapajos, and that I should be reluctant to undertake such expensive and arduous voyages again. Forward me as often as you can a few numbers of the 'Zoologist,' especially for the sake of the reports of the Entomological Society contained therein; also all new Museum Catalogues of mammals, birds, reptiles, fishes and insects as they appear, and Chenu's work, as being cheap, and easily replaced if lost. As a brother of the net, the death of Mr. J. F. Stephens was very sad intelligence; he did a great deal towards popularizing and facilitating Entomology in England. I should much like to have you here for three months; the novelty to me has, of course, worn off, but the real fixed interest in the objects has constantly increased. I do not now feel startled to see, instead of a few Pieris Rapæ, Gonepteryx Rhamni, Vanessa Urticæ, Polyommatus Alexis, &c., crowds of large yellow and orange Callidryas, madly darting about the suburbs, with quantities of the green Cethonia Dido, Agraulis Vanillæ, strange silver-spangled Argynnidæ, with long narrow wings, numbers of delicate little Terias, where there is a carpeting of flowering shrubs; big Phanæi, especially Ph. lancifer and Ph. Mimus, and great heavy Coprides, lying smashed on the path-ways in early morning; bright green Callichromas, with red legs, smelling of musk more strongly than your nearly allied Aromia moschata, pestering one everywhere on showery days; besides another of the Cerambycidæ—Chlorida festiva—flying into one's face whilst writing by lamp-light. One entomological phenomenon, which struck me very much on my first arrival, I have now got so used to as not to notice it, except when I make an effort to do so; it is the wonderful incessant ringing of the Grylli and Acridia at night, in the suburbs of the towns, joined to the quacking, drumming, and hooting of the toads and tree-frogs: it fills the air with a resonance of life quite magical to a European. I speak now only of open grounds in the suburbs of towns; but where I should like to accompany you is through the over-arching shades of roads in the virgin forest. The insects of open grounds are all species very common throughout Tropical America; in the forests everything is different: and here we cannot make any comparison intelligible to an English entomologist. Of moths you see very few, at night none. Some things allied to Polia and Acronycta we see very rarely on trunks; the other Noctuæ are almost entirely of the genus Erebus, known by the long, cylindrical, terminal joint of the palpi: they lurk amidst the murkiest shades, and settle generally at the foot of tree-trunks, surrounded by entangled *sipés* at night. Some species frequent houses, but these are always different from those of the forests: many I have seen without being able to secure specimens of as yet: twice I have seen Erebus Strix, expanding nearly a foot in breadth, applied flat to the trunks of trees. Sesiadæ are the most abundant Nocturnes; perhaps I have taken eighty species. As to Geometridæ, they appear to be replaced by the diurnal family Erycinidæ, *which fly out of bushes* when beaten, just as the Acidaliæ, Emmelesiæ, &c. do in England. There are plenty of species of Tortricidæ, some pretty Pyralidæ, even Alucitidæ, in the woods, which you, with Messrs. Stainton & Co., would make great things of, no doubt, if you were here, and not prevented from attending to them on account of the greater interest of a series of twelve hundred species of Diurnes, and *new* species almost every day.

"I am almost forgetting more important matters. Since the 10th of March, the Rio Nigro steamer has made its third monthly voyage, and brought news that another steamer would most certainly be put on the line from Barra to Nauta, in Peru, four months hence. I liked to see the show of energy and punctuality this voyage, and therefore think you may conclude that I shall revisit Ega, and go beyond. I expect to do wonders, besides, I have so very much more knowledge of the species: this is my chief reason for writing to you so soon. I have enough to do here until the steamer comes, besides waiting for all the entomological cheap books and papers you can send. Only think! — since writing on March 10th, I have taken sixty-five *new* species of Coleoptera, chiefly minute, indeed, but very interesting, such as six species of Echiaster, *Erichs.* (a genus of Pædinidæ), a duplicate of the new Metopias mentioned, besides several specimens of a third species, *quite new*. Besides these, six new longicorns, two new Megacephalæ (only one of each), one of which is undoubtedly M. affinis, *Dej.*, both very peculiar species of the metallic group; and several *new* genera and species of Brachinidæ from quite new ground.

"I have now interested an influential head of the Indians; from him I have at last a clew to the Lepidosiren. He describes it exactly; the Indian name is Tambaki-unboyia, which means the Tambaki serpent—Tambaki being a very common eatable fish, feeding on fruits in the submerged *ygapós* which the Lepidosiren frequents, and has scales very similar in appearance to those of the Lepidosiren.

"H. W. BATES."

General Natural-History Society. — It has struck me that by a little arrangement between local Natural-History Societies, the science might be much advanced, and facilities be offered for new Societies to be formed: I appeal therefore to all naturalists to assist in carrying out my views. For the first step, we must be indebted to your kindness: it is, to publish in the 'Zoologist' a list of all Natural-History Societies, with the names of the President and Secretary of each: a request from you in the 'Zoologist' would obtain this. This information being obtained, I would suggest that the papers read at one Society should be passed on until all the Societies had read them: this appears to me an excellent way of disseminating knowledge: it would also bind us more together, and give us an interest in each other. Natural History, or rather its friends, appear to be awaking from their torpor; and I think, by a slight effort, we might now place her in the proper rank. I shall be happy to attend to any communication I may receive.—*William Thompson; Weymouth, October* 15, 1853.

On preserving the Balance between the Animal and Vegetable Organisms in Sea Water. By ROBERT WARINGTON, Esq.*

IN the published notices of my experiments of 1849, to maintain the balance between the animal and vegetable organisms in a confined and limited portion of water, the fact was demonstrated, that, in consequence of the natural decay of the vegetation, its subsequent decomposition and the mucus-growth to which it gave rise, this balance could only be sustained for a very short period, but, if another member were introduced, which would feed upon the decaying vegetation and thus prevent the accumulation of these destructive products—a function most admirably performed by the various species of water-snail—such balance was capable of being continuously maintained without the slightest difficulty; and I may add, that the experimental proof of this has now been carried on, in a small tank in the heart of London, for the last four years and a half, without any change or disturbance of the water; the loss which takes place by evaporation being made up with rain or distilled water, so as to avoid any great increase of the mineral ingredients originally present. It follows then, as a natural deduction, from the successful demonstration of these premises, that the same balance should be capable of being established, under analogous circumstances, in sea water. And in a paper published in January, 1852†, I stated that I was, at that time, "attempting the same kind of arrangement with a confined portion of sea water, employing some of the green sea-weeds for the vegetable member of the circle, and the common periwinkle as the representative of the water-snail."

The sea water with which the experiments I am about to detail were conducted, was obtained through the medium of one of the oyster-boats at the Billingsgate fish-market, and was taken from the middle of the English Channel.

My first object was to ascertain the kind of sea-weed best fitted, under ordinary circumstances, for keeping the water clear and sweet, and in a sufficiently oxygenated state to sustain animal life. And here opinions were at variance, for one naturalist friend whom I consulted, advised me to employ the Rhodosperms; another stated that it was impossible to make the red weeds answer the purpose, as he had tried them, and strongly recommended the olive or brown-coloured Algæ; while, again, others thought that I should be more successful with those which had in theory first suggested themselves to my own mind, namely the Chlorosperms. After making numerous unsuccessful experiments with both the brown and the red varieties of Algæ, I was fully convinced that, under ordinary circumstances, the green weeds were the best adapted for the purpose.

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* Read at the Hull Meeting of the British Association. Printed in the 'Annals and Magazine of Natural History' for November, 1853, and communicated by the Author for publication in the 'Zoologist.'

† 'Gardeners' Botanical Magazine and Garden Companion,' Jan. 1852.

This point having been practically ascertained, and some good pieces of the Enteromorpha and Ulva latissima in a healthy state, attached to nodules of flint or chalk, having been procured from the shore near Broadstairs, several living animal subjects were introduced together with the periwinkle. Everything progressed satisfactorily, and these all continued in a healthy and lively condition.

My first trials were conducted in one of the small tanks which had been used for fresh water; but as it was necessary, during the unsuccessful experiments with the brown and red sea-weeds, to agitate and aërate the water, which had been rendered foul from the quantity of mucus or gelatinous matter generated during the decay of their fronds, until the whole had become oxidized, and the water rendered clear and fitted for another experiment, it was, therefore, for greater convenience, removed into a shallow earthen pan and covered with a large glass shade to protect the surface of the water, as much as possible, from the dust and soot of the London atmosphere, and at the same time impede the evaporation. In this vessel then I had succeeded perfectly in keeping a large number of beautiful living specimens in a healthy condition up to the close of 1852. I therefore gave instructions for the making of a small tank as a more permanent reservoir, and one more adapted for carrying on my observations and investigations on the œconomy and habits of the inhabitants.

From the experience I had obtained in my experiments with the freshwater tank, I was induced to modify slightly the construction of this vessel; thus, at the back, or part towards the light, the framing was filled with slate in the same way as the ends and bottom; for I had found that the glass, originally employed, very soon became covered with a confervoid growth which had an unpleasing appearance to the eye, and in consequence of which I had been obliged to paint the glass on the exterior to prevent this growth from increasing to too great an extent. It was also an unnatural mode of illumination, as all the light should pass through the surface of the water. The front towards the room and the observer was constructed of plate glass, the whole being set in a stout framework of zinc, and cemented with what is known under the name of Scott's cement, and which I have found to answer for the purpose most admirably. Within this tank were arranged several large pieces of rock-work, thrown into an arched form, and other fragments were cemented in places against the slate at the back and ends, and at parts along the water-line, so that the creatures could hide themselves at pleasure; a short beach of pebbles was also constructed in order that shallow water could be resorted to if desired. The whole tank was covered with a light glass shade to keep out the dust and retard evaporation.

With the sea water obtained in January, 1852, I have been working without cessation up to the present time, agitating and aërating when it became foul during the unsuccessful experiments on the sea-weeds, but since then it has been rarely ever disturbed; the loss which takes place from evaporation being made up, as before stated, with rain or distilled water.

For a considerable period, after commencing these experiments, I was much troubled to obtain living subjects in a healthy condition, but having alluded to this, and the success of my investigations, in a short notice appended to a paper published in the 'Annals' for October, 1852 (see also Zool. 3633), my friend, Mr. P. H. Gosse, who was then sojourning at Ilfracombe for his health, offered in the kindest manner possible to supply me with materials, and from that period he has always most heartily responded to my wants. It must not be imagined for a moment that the beautiful creatures I have thus received have been all preserved alive or always quite healthy. In experimental investigations this would be unreasonable to expect, as the very fact of experimenting implies a disturbance of the then state of things. Besides which, from want of a sufficient knowledge of Natural History, from want of forethought and experience and other causes, I have lost many very fine specimens; and as the detail of these losses may prevent the occurrence of the like annoyances to others, I shall venture to occupy your time for a short period with their history.

My greatest loss arose from too great an anxiety to transfer the collection I had preserved in a healthy condition to the end of December, 1852, into the new tank. As soon as it arrived from the maker's I lost no time in introducing my numerous family to their new abode, and dearly I paid for my precipitancy, for on the next morning I found many of my most beautiful specimens dead; thus I lost two fine Holothurias (*H. Pentactes*), a small freckled goby (*Gobius minutus*), a beautiful little pipe-fish (*Syngnathus lumbriciformis*), and several others, and on opening the door of the case the cause of this mortality was at once evident,—an iridescent film of oily matter was floating on the surface of the water, arising from the paint with which the angular joints and edges of the small tank had been coloured not having become sufficiently hardened.

Another source of loss arises from the several creatures attacking and devouring each other, and it therefore becomes a point of great importance—and highly necessary to be carefully observed, where their preservation is an object—to ascertain what varieties may be safely associated in the same tank; as, for instance, I have found that the shrimps and prawns attack, and very soon devour, all the larger varieties of corallines and Polyps, Sabellæ, Serpulæ, rock-borers, Cirrhipeds, some of the Annelids, many bivalve and univalve mollusks that are unprotected by an operculum, or have no power of closing their valves. The instances which have come under my own immediate observation have been the destruction of the Pholas dactylus, Saxicava rugosa, Cypræa Europæa, and several specimens of Sabellæ, Serpulæ, Coryne sessilis, and many others.

The common crab (*Cancer Mænas*) is likewise a most destructive agent; and the tribe of rock-fish, the blennies, gobies, &c. are also most voracious, devouring all the varieties of Cirrhipeds, corallines, Polyps, Annelids, &c.; they will also attack the shrimps and prawns, and even seize upon the horns of the periwinkle, which they bite off. If the mollusks do not keep a very firm hold of the rock or tank sides, they are rapidly turned over by these fish on their backs and lie helplessly exposed to their attacks.* It is doubtless their seeking food of this kind which causes these little fish to be so generally found in the shallow rock-pools of the coast. In consequence of these ravenous propensities, I have been obliged to establish several small tanks and imitation rock-pools, so as to separate these various depredators from each other: thus in one I have varieties of Actinia, shrimps, Nudibranchs, Holothurias, and some Annelids; in a second the rock-fish, as the blennies, gobies, Cottus, with crabs and Actiniæ; in a third corallines, Annelids, Polyps, rock-borers, Sabellæ, Serpulæ, Holothurias, and Actiniæ.

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* Since the reading of this paper at Hull I have received a blenny of larger size, being about 3½ inches in length, and although it has become so tame that it will allow itself to be touched by the hand and takes its food from the fingers, yet its destructive propensities are so great, that it very soon killed four small crabs; and to save three others, of rather a larger size, I have been obliged to remove the blenny to a rock-pool in association with his own species and a few Actiniæ. The only refuge the poor crabs had was to bury themselves in the sand, and whenever they attempted to move out of their refuge they were immediately pounced upon and only escaped by burrowing rapidly again.

Another curious instance of loss I may detail which has quite recently occurred, and which may prove interesting; it was in a small rock-pool containing blennies, gobies, crabs, &c. I had procured two live oysters for the purpose of feeding my numerous small fry in these vivaria, and one of these having proved ample for the purpose of one meal, the other was placed on the sandy bottom; on the second day after this the oyster was observed to have opened the valves of his shell to a great extent, which were afterwards seen closed, but a small Gobius niger, inhabiting the pool, could nowhere be seen. The day after this the oyster was opened for the general feeding, when, lo! within the shell was found the unfortunate Gobius, quite dead. Whether this little gentleman had been attracted within the trap by curiosity or the ciliary motion of the oyster, it is impossible with certainty to say; but that he must have seized on some sensitive part of the oyster is more than probable, so as to have caused such a rapid closing of the valves of the shell as could entrap so active a burglar.

Another important point is the gravity of the sea water; this should be very carefully regulated, for it must be borne in mind that many of the marine creatures are supplied by a permeation of water through their tissues or over their delicate and beautiful organs. The specific gravity should not rise above 1026 at 60° Fahr., and a small hydrometer should be at short periods introduced to ascertain that this point is not exceeded, particularly during the hot months of summer. The reduction to this gravity can be readily effected by the addition of rain or distilled water. Many of the creatures will of themselves afford indications of this increase of density; some of the Actiniæ will remain closed and become coated with a white slimy covering within which they remain for a length of time, and if the specific gravity of the water be lowered this is very soon ruptured by their expansion, thrown off, and the tentacula become soon extended.

All putrescent matter or excess of food or rejecta of the Actiniæ should be carefully removed from the water, as the noxious gaseous compounds generated by the decay of such matters appear to diffuse themselves rapidly through the water, act as a virulent poison, and speedily destroy the vitality of the occupants. Thus many beautiful subjects were lost in a few hours from the introduction, into a small glass jar, of a large Pecten shell, encrusted with corallines, which had become loaded with putrescent matter by partial submersion in a foul muddy bottom.

Great care should also be taken in moving the Actiniæ that the foot or sucking disk with which it attaches itself to the rocks, stones, or weed, be not injured, as, when this occurs, they rarely survive, but roll about without attaching themselves, and gradually waste away and die.

With these exceptions then, everything has gone on very satisfactorily, care being always taken not to overload the water with too large a proportion of animal life for the vegetation to balance, as, whenever this has been inadvertently attempted, the water has soon become foul, and the whole contents of the tank, both animal and vegetable, have rapidly suffered, and it has required some time before the water could be restored to its former healthy condition.

In one of the numbers of the 'Zoologist' of last year, I stated that besides the Ulvæ, Enteromorphæ and Cladophoræ, I had found the Zostera marina a very useful plant for oxygenating the sea water; but this observation has reference only to the case of a tank supplied with a ground where its roots will find a sufficiency of food for its growth, as in a clear shingle or sand it soon decays; and it should be associated with such animals as delight in a ground of this nature, as many of the Annelids, crabs, burrowing shrimps, &c. There are several interesting observations which have been made from time to time connected with this subject, which I hope to lay before the Natural-History world as soon as I can find leisure time for the purpose.

ROBERT WARINGTON.

Apothecaries' Hall, Sept. 10th, 1853.

Note on the Grasshopper Warbler. — In corroboration of Mr. Stevenson's note on the grasshopper warbler (Zool. 4072), I may mention that two nests with eggs were found here this summer, in swampy hollows in a small glen. Two or three years ago a nest with four eggs was taken in an orchard on the banks of the Wear, in the city of Durham; and a birds'-nesting boy showed me in his collection last year, nearly a dozen of these beautiful little eggs, which he had taken himself, but of which he did not know the name.—*H. B. Tristram; Castle Eden, Durham, November* 1, 1853.

Occurrence of the Roller (Coracias garrula) *near the Land's End.* — The roller has again made its appearance on our western shores; and the specimen now under notice was captured a few days since in the parish of St. Just, in Penaith, a few miles north of the Land's End. On dissection it proves to be a female, with the ovarium fully developed; and from the hard and compact state of the bones, it appears to be beyond a bird of the year. The plumage is generally obscure, and presents the characters of a bird of the year; the brilliant hues of blue are confined to the quill-feathers and tail, and the rich brown on the dorsal feathers is only partially developed. This specimen, now in the possession of Mr. Vingoe, corresponds exactly with the example brought to me some years since, and reported at the time in the 'Zoologist.' — *Edward Hearle Rodd; Penzance, October* 17, 1853.

Note on the Hooded Crow, (Corvus Cornix). — As a friend of mine was walking on the sands near Cromer on the 24th ult., he observed a solitary hooded crow flying over from the sea, evidently fatigued with a long passage. He fired at it, and saw it immediately drop a small bird from its beak, which proved to be a chaffinch, with the skull fractured. Would not this seem to show that the crow had fallen in with a flock of chaffinches on the passage, and had secured one of his fellow-travellers for a meal on its arrival?—*Robert Birkbeck; Keswick, November* 4, 1853.

Note on the Woodcock, (Scolopax rusticola). — This favourite little "possessor of the long bill" has, in my opinion, made its appearance in this neighbourhood remarkably early, considering the season. A fine specimen was shot upon Blagdon, by Mr. Henville, on Friday the 14th instant: the "old people" say this portends a severe winter. Several others have been shot since. The appearances generally have not been observed here before the 24th instant; but I remember, several years ago, hearing of the occurrence of one so early as the 3rd of October. — *John Garland; Dorchester, October* 31, 1853.

Note on a White Variety of the Common Tern. — A tern, apparently a bird of this year, and an accidental variety of the common species, was shot at Lowestoft on the 12th of August, which was remarkable for having the entire plumage of a pure snow-white, except some minute horizontal ash-coloured lines between the nostrils and the eyes, a very slight smoke-coloured tint covering the whole remainder of the head from the eyes backwards, and a little tinge of gray on the quill-feathers of the wings. The colouring of the irides, of the beak, and the feet resembled that of ordinary immature specimens of the common tern.—*J. H. Gurney; Easton, Norfolk, October* 21, 1853.

Note on the occurrence of the Pectoral Sandpiper and Nutcracker near Yarmouth. —The above two rare birds have been recently obtained in the neighbourhood of Yarmouth, the first on the 30th of September, and the second about the 10th of October. I had the opportunity of examining the sandpiper in the flesh; it was a female, and apparently a bird of the year: it was not fat, but in very fair condition. The stomach contained some small seeds, and the remains of a few insects, but too mutilated to be recognizable with clearness.—*Id.*

Pike and Tench. — Mr. Slaney (Zool. 4020), alluding to the commonly received opinion that the tench, being the physician of fish, is respected as such, and therefore is not preyed upon by other species, relates, as something extraordinary, an instance of a pike having seized a tench crossways, which was too large to be swallowed, and swam about with it for a considerable time, carrying it between his jaws. This instance goes far to prove that the beautiful theory about the pike not feeding upon tench is a "vulgar error," as it most surely is; for I have, before now, myself seen a fine tench taken out of the stomach of a pike. Mr. Slaney, however, states that the instance he records is "the only one he ever met with in which the tench was attacked by any other fish," &c., and that "all other kinds of fish, rats, young ducks, &c., have fallen a sacrifice to the all-devouring pike, *but not the tench*." I heartily wish the latter part of this statement were true, and borne out by fact. Now I will relate what lately occurred to myself. In the autumn of 1848 I turned into a pit, which I believed to contain no fish of any kind, fifty small tench and forty or more crucian carp; seven tench and twenty-four crucians were also turned in at a subsequent period. One sunny day last August I was much surprised at seeing three or four very small pike basking in the shallow near the side of the pit; they were not so long as my finger, and must have been bred the foregoing spring. This convinced me that, no doubt, there were some larger pike in the water, the parents of these small fry; and I began to think it would fare but badly with my store tench and crucians. So I resolved to drag the pit, and accordingly did so on the 13th of October. We caught three pike, weighing respectively, I should guess, 3 ℔s., 2 ℔s., and 1½ ℔., or thereabouts. They were not in good condition, and, from their length and frame, ought to have been considerably heavier. But what had become of the tench and the crucians? All that remained out of the fifty-seven tench and the sixty-four or more crucians, were one tench of 1½ ℔. weight, and eight crucians of about 1 ℔. each. I cannot have the smallest doubt that the pike had devoured the fish that were missing; and that these nine that remained only escaped because they were rather too large for pike of the size above-mentioned to swallow conveniently. I am quite aware that a pike of 3 ℔s. will make no great difficulty of devouring an ordinary fish of a pound weight or more; but the crucian carp is so deep a fish, being nearly as broad as it is long, that one of less even than a pound would be a very awkward morsel for any but a large pike to swallow. The above is not a solitary instance of its kind: similar ones, and those even still more decisive of the point in question, have come under my notice several times. As to the opinions of keepers, I cannot always place implicit confidence in them. I remember once trolling for pike in a large pool or lake, which, among other fish, abounded in bream. The keeper, an intelligent man, insisted on it that pike never preyed upon bream. I was very sceptical; or, rather, I totally disbelieved the statement: so, to test the matter, I set to work and trolled with a small bream as a bait, and presently convinced him of his error by catching a pike with it. The fact is, when the pike is in the humour for his prey, nothing that he sees in motion comes amiss to him, be it fish, flesh or fowl, or even far less digestible articles, as, for example, ordinary pebble-stones of considerable size, which, in several instances, I have known taken out of a pike's stomach, (see Loudon's Mag. Nat. Hist. iii. 241). It may seem a strange thing to say, nevertheless it is a veritable fact, that pike, and, I may add, trout and perch too, will absolutely eat a larger fish than it is possible for them to swallow, — to swallow, that is, *all at once*; so that while the head of the prey is digesting in the stomach, the tail end remains projecting out of the mouth of the devourer; and it will sometimes happen that in this way the pike is choked, and falls a sacrifice to his own voracity. I was a good deal amused at the title I once heard given to the pike by a miller residing on the Wiltshire Avon, a beautifully clear stream, in some parts of which the pike have nearly exterminated the trout: — "We call it, Sir," he said (apologizing for the freedom of his speech), "we call it the water-devil." I have heard of a certain gentleman, a kind of *male* Mrs. Malaprop (so to say), who, in speaking of the voracity of the pike, is reported to have said that it was "by far the most *avaricious of all quadrupeds!*" Depend upon it — and let all the lovers of the delicious physician of fish bear it in mind—that the notion that the pike will not feed upon tench, is just about as true as to say that we bipeds will not eat beef and pudding.— *W. T. Bree ; Allesley Rectory, October* 27, 1853.

Postscript to the preceding Note.—Since the above was written, I have seen by the November number (Zool. 4100) that Mr. Slaney has experienced fresh instances of the pike feeding on tench ; and that he is now fully convinced that the commonly received notion of the tench's immunity from the attacks of the pike is "totally unfounded." It appears also from Mr. Slaney's communication, as well as from repeated instances which have come under my own observation, that the pike is, as I may say, *doubly* destructive of tench as well as of other fish, not only devouring such as are of a size suitable to the capacity of his jaws and stomach, but also by seizing, mutilating, and finally destroying others which are too large to be so disposed of. — *Id. ; November* 4, 1853.

Notes on the Oxfordshire Shells. By ALFRED MERLE NORMAN, Esq.

(Continued from page 3764).

IT has been with much pleasure that I have read the numerous local lists of land and fresh-water shells that have appeared in the pages of the 'Zoologist,' since the publication of my notes on the species found near Oxford, (Zool. 3761). The season which is now so rapidly drawing to a close, has certainly been a very bad one for collecting most objects of Natural History ; but there are exceptions to every rule, and "'tis an ill wind which blows no one any good." Thus, while entomologists have had to put by their nets in despair, as I, for one, have long since done ; and even ornithologists have looked in vain for those sunny days which often tempt many a stranger to cross the seas ; those who pay attention to our inland Conchology have had a harvest. Ducks, and certainly slugs and snails even more so, delight in a ducking ; and after showers, the latter may be seen in great abundance crawling along the hedge-banks, up the smooth trunks of trees, over palings, &c. For the Limaces, moisture, to produce a flow of mucus, is absolutely necessary to existence, and they have been luxuriating in this rainy season in greater numbers than I have ever noticed before. A dry hot summer is also no friend to the Helices, which will then retire to some cool spot and close their mouths with an epiphragm, in order to avoid the heat, just in the same way as they do to avoid the cold in winter. Heat and drought are even more injurious to the inhabitants of small ponds and ditches ; since when these dry up, the Mollusca perish in thousands.

Having for the last few months been staying in South Oxfordshire, I purpose giving a few remarks on the species found there, in order that I may render my Oxfordshire list of shells more complete.

The neighbourhood of Watlington, which is about sixteen miles to the South-east of Oxford, has but little water, and therefore I did not search much for the water-shells, and those few I found were contained in my previous catalogue. In land-shells, however, the locality would not be easily surpassed, since the magnificent beech-woods which crown the Chiltern Hills form a splendid preserve for shells.

The beech would seem to be an especial favourite with Mollusca, more so than any other tree; the smooth bark is what they delight in, and after showers the stems may be seen literally covered with many species, as the following notes will testify. The rotting leaves also afford food and shelter to many species.

With the exception of Helix Pomatia and H. granulata, the land-shells mentioned in the former list (Zool. 3761) are found also round Watlington; as well as the following twenty-three additional species, and two good varieties,—Helix aspersa var. *alba*, and H. ericetorum var. *obliterata*.

Arion flavus, *Forbes and Hanley*. This new species (?) is found, though but rarely, under and on moss &c. in the beech-woods.

„ hortensis. Rare, in the woods.

Limax maximus. The variety of this species which has the shield spotted with black, and the back marked with longitudinal black lines, is not uncommon on the hedge-banks of the Henley road, from half a mile to a mile from Watlington; I have also found it at Pyrton.

„ arborum, *Forbes & Hanley*. Very abundant in the beech-woods. It delights in crawling up and down the moist stems of the beeches to a considerable height. The remark made by Müller in his 'Historia Vermium' seems very applicable: he says it is "in fago vulgaris, vere et Novembro." It is very distinct from L. maximus, the sculpturing on the back in particular being totally different.

Vitrina pellucida. Very rare: a single specimen in Sherborne Wood.

Helix aspersa, var *alba*. I took some half-dozen specimens of this pretty variety on a hedge-bank at the foot of Watlington Hill; other specimens found in company with them were remarkably pale, though marked in the usual way.

„ hybrida. A few specimens among brambles, near Watlington Church.

„ lapicida. Not uncommon in the woods.

„ fulva. Moist ground among moss, Pyrton.

Helix depilata. Rare, under stones lying on grass, Pyrton Common.

„ ericetorum, var. *obliterata*, Hartmann. Common along the Ickleton Way from Watlington to Ewelme, and is also to be found on Pyrton Common.

Zonites rotundatus. Common under timber lying on the ground, stones, &c., in the woods and elsewhere.

„ cellarius. Not common; among the under rotting leaves of Iris fœtidissima, Pyrton.

„ alliarius. Frequent among decaying beech-leaves in Sherborne Wood.

„ purus. Not common; in similar situations to the last, in the Cuckoo-pen, Sherborne Down.

„ nitidulus. Very rare; two specimens at roots of grass on the Henley road.

„ crystallinus. Among rotting beech-leaves in the woods, and at roots of grass, Pyrton.

Bulimus Lackamensis. This species is to be found on the trunks of beeches in all the woods round the neighbourhood, in great numbers, after rain, and climbs up them frequently to the height of from 30 to 40 feet. I once took no less than three dozen from the trunk of a single tree.

„ obscurus. Common, though not so abundant as the last, with which it is found in company. The shells of the young of these two species are generally much encrusted with earth &c.

Achatina Acicula. Not common; at roots of junipers, on Swincombe Down.

Pupa Juniperi. Common on the trunks of beeches, in Sherborne Wood, especially at the outskirts of the western side.

Vertigo pygmæa. Frequent at roots of grass and junipers, on Swincombe Down.

Clausilia bidens. Abundant on the beech-trees. I only saw one specimen of the white variety, whereas in other parts of the country I have sometimes found the white in almost equal numbers to the brown.

Carychium minimum. To be found among the rotting beech-leaves in all the woods, and also at the roots of grass by wood-sides, &c.

Cyclostoma elegans. Not uncommon among leaves in the beech-woods.

I have thus met with seventy-six species, besides numerous varieties, in Oxfordshire; and to this list may be added eleven others, which I have not myself found, but which are enumerated in a catalogue of sixty-six shells, which the late Mr. Hugh Edwin Strickland, whose melancholy death all who take an interest in Natural History have so recently had to deplore, published in Loudon's 'Magazine of Natural History' (viii. 494), as found by himself in the vicinity of Henley-on-Thames.

In conclusion, I would add that I shall be happy to assist, as far as lies in my power, any gentleman who may wish to exchange our marine for inland shells. I also have a few desiderata among the latter; and should feel extremely obliged to any one who could favour me with specimens of Pisidium cinereum, Vertigo angustior, Clausilia Rolphii, or Amphipepla involuta.

Alfred Merle Norman.

Clevedon, Somerset, October 10, 1853.

Note on the supposed late Appearance of Insects.—In the report of the Proceedings of the Society of British Entomologists for July last (Zool. 4007), Mr. Harding, the President, observed, in proof of the backwardness of the season, as shown by the late appearance of many kinds of insects, that "he took some fine specimens of Semiophora gothica at the end of May;" and as he evidently considered this a late period for the occurrence of this species, it may not be uninteresting to entomologists to know that I myself took at sugar, in Berewood, Dorsetshire, on the evening of Tuesday, the 19th of June last, six specimens of this same insect, in as beautiful condition as if they had just escaped from the chrysalis. Now, although many kinds of insects are accelerated or retarded in their appearance by the fineness or warmth of the season, or the contrary, yet this is by no means universally the case; although, no doubt, if we were thoroughly acquainted with the economy of all insects, we should readily perceive why this variation of seasons should influence some without affecting others. For instance, Heliothis Dipsacea, which occurs in some profusion on different parts of our heaths in Dorsetshire, appeared at precisely the same time as I had observed it in former seasons, and in about the same numbers as usual. I may here mention that I have always found this insect remarkably constant to about one time of appearance, never having seen it before the 12th of July, or after the end of the first week in August, although I have looked for it constantly, both before the former time, and after the latter. Pamphila Actæon also I found true to its time this season, even to a day, and in about the usual profusion, although, as the weather was very unfavourable during my two days' visit to its locality, I did not procure anything like the number of specimens that might have been obtained in fine bright weather, though what I did get (nine dozen) were in much finer condition than they would have been if the sun had shone continuously, and enabled them to exert their active and pugnacious propensities to the detriment of their plumage. Anarta Myrtilli, and several other heath species, such as Ericetaria, caliginosa, &c., all kept to their usual times of appearance; while Plusia Gamma, generally so common on the heath-blossoms, was not only much later than usual, but when it did appear, was about the rarest insect on the heath at that time (the end of July). Hipparchia Semele and Polyommatus Ægon appeared at about the same time as usual, and in their ordinary numbers. Triphæna pronuba and Polia nebulosa, generally numerous, and sometimes quite a nuisance at sugar, by the end of June, had not made their appearance by the 19th of July. As far as my own observations have extended, the more local the species the more constant seem to be their times of appearance; but it requires much more experience than I have had, both in looking for and awaiting species at their ordinary seasons, and in examining the peculiarities of their transformations, to be able to lay down with any degree of accuracy even the most general rules on this most interesting part of Entomology. In connexion with this subject, the present season has remarkably proved the truth of the old saying, that good plum seasons and plenty of wasps are generally concurrent, and *vice versâ;* for in some parts of Dorsetshire where the plums, in common with other like fruits, have almost failed, owing to late frosts and blight, there are scarcely any wasps at all, while in this neighbourhood, where every tree has been loaded with plums, the wasps are so numerous as to be a perfect nuisance, if the windows are left open at meal-times. — *Octavius Pickard-Cambridge; Hatch Beauchamp, Taunton, September* 23, 1853.

Lepidoptera taken near Tenterden.—Not having seen in the 'Zoologist' any list of Lepidoptera taken in the neighbourhood of Tenterden, the following may be acceptable. Where the contrary is not stated, all have been captured by myself, principally in one locality, — Knock Wood. I have included in the list none but the more uncommon species.

Thecla Betulæ, one, on oak, August; another seen but not taken.
Melitæa Athalia, heathy spots, June; not uncommon but very local.
Apatura Iris, two seen but neither captured.
Chœrocampa Celerio, one specimen, (Zool. 3624).
Deiopeia pulchella, one, wasted, in a cobweb.
Zeuzera Æsculi, larvæ not uncommon, imago but seldom met with,
Platypteryx lacertula, two, by beating hazels, border of the wood, August.
„ falcula, two on wing, July.
„ unguicula, one, beaten from oak, wasted, August.
Ptilodontis palpina, not uncommon, attracted by light at night.
Apatela leporina, not uncommon at sugar; I have taken perfect specimens in June, July, and August.
Acronycta auricoma, not rare at sugar.
Diphthera Orion, two, very perfect, at sugar, June, one wasted, July.
Cymatophora Oo, one, at sugar, July.
Tethea retusa, one, at sugar, near the town.
Cosmia pyralina, one, at sugar, August.
Xantholeuca croceago, one, at sugar, September.
Hadena lutulenta, one, at sugar, near the town.
Aplecta advena, two, at sugar, June.
„ occulta, one, at sugar, September.
Calocampa vetusta, one, at sugar, September.
Philopyra pyramidea, one, at sugar, near the church.
Toxocampa pastinum, one, by beating a hedge near the wood, July.
Pyrausta octomaculalis, one seen in a damp part of the wood.
Pyralis glaucinalis, one, beaten from a hedge near the mill-ponds.
Asopia flammealis, common, by beating oaks.

Pionea stramentalis, tolerably plentiful about Tenterden, in damp parts of woods, &c., July and August.
Botys lancealis, one, by beating, July.
Madopa salicalis, one, on wing, June.
Polypogon derivalis, not uncommon, by beating and on wing.
Hypenodes albistrigalis, ditto.
Nola strigulalis, two, beaten from a hedge near the town.
Geometra papilionaria, one, very perfect, at sugar, July.
Eurymene dolobraria, one taken, another seen, at sugar, June.
Ennomos lunaria, one, taken on wing.
Aventia flexularia, one, beaten from a maple hedge near the town.
Biston prodromaria, one, taken by a friend.
Eucosmia undularia, two, taken on wing, June.
Ephyra orbicularia, two, by beating.
Eupithecia pulchellaria, one, by beating.
Acidalia inornaria, ditto.
Halias quercana, one, taken by a friend.
Crambus pinetellus, sparingly at sugar, also by beating.
Lithocolletis Roboris, one, beaten from a hedge near the wood.
Pterophorus monodactylus, one, by beating.

—*S. C. Tress Beale; Wadham College, Oxford, October* 22, 1853.

Micro-Lepidoptera of the New Forest, Hampshire.

By Thomas Boyd, Esq.

A visit of a few weeks during the past summer to Lyndhurst and the neighbourhood, has gratified, though far from satisfied a desire to work the Micro-Lepidoptera of the New Forest, which was raised in my mind by Mr. Douglas's paper in the 'Zoologist,' on the New Forest as an entomological locality: and I think the accompanying list of some of my best captures among the Tineidæ, will prove that it will amply repay any Micro-Lepidopterist who will work it.

I took Crambus silvellus rather freely, and as I still have some duplicates left, shall be happy to supply any one who may be in want of the species.

Should any one be induced to pay a visit to Lyndhurst at any future time, I shall be happy to give him any information in my power with regard to localities, &c.

Crambus dumetellus. Middle of July.

„ silvellus. On a swamp, July and August, apparently attached to a very wet kind of moss growing at the edge of the swamp; easily disturbed during the day, and flying for a short time at sunset.

Crambus selasellus. With the preceding, but more distributed, and flies later.

Eudorea Cratægella. August 1.

„ concinnella. July 28 and August 30.

„ delunella. Middle of July, from palings, &c.

„ pallida. Middle of August, rather poor, from a swamp.

Ephestia semirufa. July 8.

Acrobasis consociella and tumidella. End of July and beginning of August, by treacling, &c.

Myelois epelydella.

Tinea Carpinetella. August 1.

„ Knockiella. July 23.

„ semifulvella. Middle of July.

Plutella sylvella. Beginning of September.

„ Alpella. Beginning of August, cocoons taken off oaks.

„ nemorella. July.

„ scabrella, end of August, beaten from various trees; near wild apple-trees.

Gelechia Walkeriella. July, on a small heath.

„ atrella. July, flying at dusk over heath.

„ nigrovittella. August 31.

„ Gerronella.

Argyresthia semitestacella. End of August, among beeches.

„ glaucinella. Middle of July, on a paling.

„ Andereggiella. End of August, rather poor, from wild apple-trees.

Coleophora discordella. August 2, on a heath.

Gracilaria Tringipennella. End of August.

„ auroguttella. Beginning of August.

„ Phasianipennella. Three specimens, August 31, September 3 and 6.

„ elongella. From alder, larvæ in September, imago in October.

Coriscium sulphurellum. End of August.

Elachista Rhamniella. Middle of August.

„ pulchella. July and August.

„ Rhynchosporella. July, on a heath, apparently attached to a species of cotton-grass; flies for a very short time at sunset, but is difficult to obtain by sweeping, as it falls down as soon as the grass is touched.

„ biatomella. July 8.

Lithocolletis lautella. Bred from oak-leaves, mines the under side.

„ Coryli. Mining the upper side of hazel-leaves.

„ Nicellii. Mining the under side of hazel-leaves.

„ Ulmifoliella.

„ viminiella. Beaten out of a sallow-hedge, end of August.

„ Stettinensis. Mining the upper side of alder-leaves, the larvæ coming out on the under side.

„ trifasciella. Larvæ end of August.

And several Nepticulæ, which are uncommon only because they have never been looked after, and the names of which are not accurately decided.

THOMAS BOYD.

17, Clapton Square, November, 1853.

Note on Cerura Vinula.—I have now a specimen of this moth, in the pupa state, which changed in August, 1852, so that this is the second winter of its pupation. It exhibits signs of life when handled. Though I have bred many of these moths, I have never before observed one remain two years in the chrysalis; probably this one will be developed next spring. — *John R. S. Clifford; 21, Queen's Row, Pimlico, November* 1, 1853.

Note on Hemerophila abruptaria. — This moth, in most entomological works, is marked as uncommon. It has been taken, however, in some plenty, both this season and the last, in the month of May, in a lane near Notting Hill. I have also taken two in Kensington Gardens, and have received a specimen this season from Shropshire, and another locality which I do not remember.—*Id.*

Mode of killing Neuroptera. — I have until lately experienced great difficulty in killing these, and especially the larger Libellulidæ. An easy and efficacious method recommended to me, is to drop a small quantity of camphorated spirit on the thorax, while the insect is confined in the net: this, if dropped just behind the head, at its junction with the thorax, produces death in a few seconds. An advantage of this method is, that both the camphor and the spirit are volatile, and will soon evaporate, leaving the specimen uninjured.—*Id.*

On the Scarcity of Hymenopterous Insects in certain Localities, particularly the Bombi, in 1853.—I have seldom witnessed so great a scarcity of the Bombi, since the years 1816 and 1839, as in the summer of 1853. In the spring I observed very few queens of the different species, which I attributed to the excessive rains and floods in November, December, and January last. After a very late spring, I observed a few of Bombus lucorum and B. pratorum; many of these seem to have perished in June and July. In the beginning of September I noticed one specimen of the male of B. lucorum (the most common), but have not seen one of B. pratorum: they seem to be nearly annihilated for the present. That most common species, B. subterraneus, has also become nearly extinct here, and of B. hortorum I have not seen one. The few nests of these species that I have found, have been on the edge of the steep banks of the canal; and it is wonderful to see the instinct displayed by all the queen Bombi in choosing a place where the wet is drained off from their domicile. Wasps were also very scarce in the spring, no doubt from the same cause. Hive-bees also have suffered severely from the wetness of the past season, and, according to present appearances, they seem likely to be diminished one half in number throughout the country, few stocks having collected enough honey to keep them until next spring. In the summer of 1852, this neighbourhood had abundance of the different Bombi, particucularly of B. lucorum and B. lapidarius. I watched about half-a-dozen of their nests, and am confirmed in my opinion that the males leave the nest but once, never to return, although the period of leaving depends a good deal on the progress of heat and cold in the season. In 1851, the males of three or four species appeared at the middle and end of June, or at latest about the 15th of July: in this last summer, they made their appearance full a month and even six weeks later, some not until the first week in September. Bombus Derhamellus is also very scarce, and this may be accounted for from their being so exposed in their habitations of moss, where they fall an easy prey to every marauder. I have hedgehogs near me, and I suspect that several nests both of B. Derhamellus and B. muscorum were plundered last summer by this animal.—*H. W. Newman; New House, Stroud, October* 6, 1853.

Capture of Aphanisticus pusillus in November. — It may be a fact interesting to many of your entomological readers, that so late in the season as November 1st, I made rather an abundant capture of Aphanisticus pusillus. I took it by sweeping long grass with moss at the roots, in a sunny nook formed by the trees in Moor Park, Farnham, Surrey. It seemed to inhabit just that particular spot, and no other. I should be glad to exchange specimens with any of your readers who may need this species. — *D. F. Jarman; Manor House, Hadley, Barnet, near London, November,* 1853.

Catalogue of Coleoptera found in the Neighbourhood of Dublin.

By A. R. Hogan, Esq.

Imperfect though a list such as the following must necessarily be, I yet trust that it will be of use in assisting to determine the limits of distribution which exist among our native beetles.

Much of the information contained in this Catalogue has been communicated to me by A. H. Haliday, Esq., and Alfred Furlong, Esq., for whose kind assistance I have great pleasure in returning my best thanks. The names of the genera are those adopted by the late Mr. Stephens in his 'Manual of British Coleoptera.'

Cicindela campestris, *L.* Killiney beach.
Demetrias atricapillus, *L.* Killiney and Portmarnock.
Dromius quadrimaculatus, *L.* Under the bark of trees, common.
Dromius linearis, *Ol.* Portmarnock, &c.
„ fasciatus, *F.* Killiney and Portmarnock.
„ foveolus, *Gyl.* Portmarnock.
„ truncatellus, *L.* Ditto.

Dromius meridionalis, *Ste.* Cherrywood, Loughlinstown.
„ melanocephalus, *Dj.* Portmarnock, &c.
„ agilis, *F.* Not uncommon.
Clivina fossor, *L.* Abundant.
Dyschirius thoracicus, *Gyl.* Portmarnock and Portrane.
„ salinus, *Schaum.* Portrane.
„ globosus, *Hbst.* Common.
Carabus granulatus, *L.* Very abundant.
„ auratus, *L.* This insect was taken some years since at Lough Bray by the Rev. E. Tardy and the late T. Coulter, Esq., but I have not heard of any recent instance of its capture.
„ glabratus, *Pk.* Lough Bray.
„ nemoralis, *Mlr.* Common.
„ catenulatus, *Pz.* Local.
„ monilis, *F.* Taken by the late J. Tardy, Esq.
„ clathratus, *L.* Enniskerry.
Leistus spinilabris, *F.* Very local.
Helobia brevicollis, *Pk.* Everywhere.
Loricera pilicornis, *F.* Common.
Badister bipustulatus, *F.* Scarce, though generally distributed.
Chlænius vestitus, *F.* Along the Dodder banks.
Anchomenus prasinus, *F.* Abundant.
„ oblongus, *F.* Rare.
„ albipes, *F.* Common.
Agonum marginatum, *L.* Dodder banks.
„ parumpunctatum, *F.* Common.
„ micans, *Nic.* Dodder banks.
„ piceum, *L.* Local.
„ Bogemanni, *Ste.* Of this rare species I have taken a single specimen at Baldoyle.
Olisthopus rotundatus, *Pk.* Sea-coast.
Synuchus vivalis, *Ill.* Portmarnock, on the sea-sands.
Sphodrus leucophthalmus, *L.* Dublin and Malahide.
Pristonychus terricola, *F.* Dublin, in cellars.
Calathus cisteloides, *Pz.* Common.
„ flavipes, *Dft.* Portmarnock.
Calathus melanocephalus, *L.* Very abundant.
„ mollis, *Mm.* Portmarnock, plentiful.
(Amphigynus, *Hal.*) piceus, *Mm.* Freqt.
Argutor erythropus, *Mm.* Local.
„ vernalis, *Gyl.* Ditto.
Adelosia picea, *Ste.* Taken by the late Mr. Tardy.
Pogonus chalceus, *Mm.* Marshes at Baldoyle, Portrane, &c.
Pœcilus cupreus, *L.* Very common.
„ var. *versicolor*, Sturm. Frequent.
Omaseus nigrita, *F.* Local.
„ melanarius, *Ill.* Not uncommon
„ orinomum, *Ste.* Military road.
Steropus madidus, *F.* Abundant.
Broscus cephalotes, *L.* Common along the sea-coast.
Platysma niger, *Ste.* Everywhere.
Abax striola, *F.* Generally distributed.
Amara similata, *Gyl.* Common.
„ vulgaris, *Gyl.* Scarce.
„ communis, *F.* Abundant.
„ trivialis, *Gyl.* Local.
„ familiaris, *Crz.* Portmarnock.
„ brunnea, *Gyl.* Ditto.
„ bifrons, *Gyl.* Ditto.
„ tibialis, *Pk.* Not common.
„ nitida, *Er.* Local.
„ acuminata, *Pk.* Not uncommon.
Bradytus apricarius, *F.* Local.
„ fulvus, *Deg.* Portmarnock.
„ consularis, *Dj.* Ditto.
Cyrtonotus piceus, *F.* Local.
Harpalus æneus, *F.* Portmarnock.
„ ruficornis, *F.* Common.
„ tardus, *Ill.* Portmarnock.
„ honestus, *Dj.* Ditto.
„ limbatus, *Sturm.* Common.
Ophonus puncticollis, *Pk.* Portmarnock.
„ pubescens, *Pk.* Marine marshes at Baldoyle, &c.
Trechus aquaticus, *Ste.* Common.
„ rubens, *F.* Very rare; Clontarf and Killiney.
„ fulvus, *Mm.* Not unfrequent.
Cillenum laterale, *Lch.* Baldoyle, abndt.

Tachys immunis, *Ste.* In river gravel.
„ obtusus, *Dj.* Local.
Ocys rubens, *Ste.* Very rare; North Bull sands and Bray.
„ currens, *Ste.* Dodder banks; very rare.
Notaphus ustulatus, *L.* Banks of the Liffey, at Celbridge.
Lopha assimilis, *Gyl.* Local.
Peryphus concinnus, *Sturm.* Mouth of the Dodder.
„ saxatilis, *Gyl.* Dodder banks.
„ maritimus, *Ste.* Killiney, but not common.
„ Bruxellensis, *Wesm.* Local.
„ littoralis, *Pz.* Not unfrequent.
„ tibialis, *Dj.* Dodder banks.
„ viridi-æneus, *Ste.* Plentiful.
„ decorus, *Dj.* Dodder banks.
Tachypus celer, *L.* Everywhere.
„ bipunctatus, *L.* Portmarnock.
„ pallidipennis, *Ste.* Baldoyle.
„ ærosus, *Er.* Dodder banks and Loughlinstown.
Philocthus æneus, *Grm.* Local.
Notiophilus aquaticus, *L.* Common.
„ semipunctatus, *Sturm.* Ditto.
„ palustris, *Dft.* Ditto.
Elaphrus riparius, *L.* Very local.

Haliplus elevatus, *Helw.* Canal, Dublin, and Loughlinstown.
„ fulvus, *F.* Not uncommon.
„ ruficollis, *Deg.* Canal, Dublin.
„ lineatocollis, *Mm.* Ditto.
„ obliquus, *F.* Ditto, taken by Miss M. Ball.
Noterus semipunctatus, *F.* Same locality.
Hyphydrus ovatus, *L.* Portmarnock, &c.
Hygrotus inæqualis, *F.* Not uncommon.
„ pictus, *F.* Phœnix Park, Zoological Gardens, but rare.
Hydroporus palustris, *L.* Somewhat local.
„ planus, *F.* Very abundant.
Hydroporus reticulatus, *F.* Canal, Dublin
„ rivalis, *Gyl.* Loughlinstown.
„ lepidus, *Ol.* Local.
„ depressus, *F.* Loughlinstown
„ erythrocephalus, *L* Not uncommon.
„ nigrita, *F.* Ditto.
„ pubescens, *Gyl.* Ditto.
Laccophilus minutus, *L.* Local.
„ hyalinus, *Deg.* Generally distributed.
Colymbetes fuscus, *L.* Common.
„ nebulosus, *Ste.* Dundrum.
„ bipustulatus, *L.* Exceedingly abundant.
„ chalconotus, *Kug.* Local.
„ guttiger, *Gyl.* A single specimen at Kingstown.
„ angustior, *Gyl.* Fox-rock &c.
„ fuliginosus, *F.* Common.
„ ater, *F.* Local.
Dytiscus marginalis, *L.* Not common, though generally distributed through the county.
Acilius sulcatus, *L.* Howth and Portmarnock.
Gyrinus natator, *L.* Everywhere.
„ æneus, *Ste.* Canal, Dublin.
Orectochilus villosus, *Mlr.* Loughlinstwn.
Heterocerus femoralis, *Kies.* Baldoyle: the var. called *sabulosus* (Hal.) also occurs here.
Helophorus grandis, *Ill.* Local.
„ aquaticus, *L.* Not uncomn.
„ granularis, *L.* Frequent.
„ griseus, *Hbst.* Local: a var. with a black head has been taken at Clontarf by Miss M. Ball.
Hydrobius fuscipes, *L.* Tolerably freqnt.
„ globulus, *Pk.* Scarce.
Laccobius minutus, *L.* Dundrum.
Limnebius mollis, *Ste.* River Dodder.
Ochthebius punctatus, *Ste.* Portmarnock.
Philhydrus melanocephalus, *L.* Local.

(To be continued).

A. R. Hogan.

Charlton, Dundrum, near Dublin,
November 3, 1853.

Notes on Ophiuridæ obtained from the Moray Firth, off Gamrie, Banffshire, and Pennan, Aberdeenshire. By the Rev. GEORGE HARRIS.

OPHIURA *texturata.* This species is very abundant, and individual examples, measuring considerably more than an inch across the disk, occur frequently. In almost every case the disk is prominently convex, and the convexity is preserved in even the dried specimen. Its form, though generally round, is by no means invariably so, but often assumes the subpentangular shape; and the triangular plates are sometimes seen to be separated by so many as three or four transverse scales.

Ophiura albida, is frequent along the coast, more particularly, I believe, to the west of this locality.

Comatula rosacea. I cannot affirm I have met with this species, but the Rev. George Gordon, of Birnie, informs me that fragments have been found, showing its existence, off Lossiemouth.

Ophiocoma Ballii. I have obtained but a few specimens of this very beautiful brittle star. The disk of the largest measures two-eighths of an inch in diameter, that of the smallest a tenth, and is pentangular. The only habitat indicated by Mr. Forbes (Brit. Star-fishes, 1841), is the Irish coast; but in addition to the above, the Rev. Mr. Gordon, of Birnie, writes me he has found several specimens of it in his neighbourhood.

Ophiocoma brachiata, seems to be very abundant. It is frequently brought up on the lines of our fishermen, though always in a very mutilated condition. The several specimens in my possession are not without the same imperfection, which however is owing to a different cause, the greater number of them having been taken from the stomach of the common haddock.

Ophiocoma granulata. I have obtained many examples of this species. It appears to congregate, and occurs in spots of limited extent. When the lines of the fishermen happen to be stretched across one of these spots, the overlying portion is occasionally found to be quite charged with them. Under "specific character" of this species, Mr. Forbes (Brit. Star-fishes, p. 50) describes the disk as "round." In the greater proportion of the specimens in my possession, the disks are either pentangular or subpentangular. The prevailing colour is dark brown, but many are also light brown, gray, and some yellow and orange, which last may be the same with that stated by Mr. Forbes as being not uncommon in specimens obtained from the Irish Sea, (p. 52).

Ophiocoma bellis. Under "specific character" of this species, Mr. Forbes describes the disk as "subpentangular," and the same is repeated in his text. In three out of eight of the many examples that have come under my observation, the reverse is the case, the greater number being round, or as nearly so as may be imagined. I would also say that the sides are less tumid than one would infer is intended by his description, and all are more thickly set with plates than is shown in his figure. In size, the disks vary from three-fourths to one-tenth of an inch in diameter, and in the case of one the surface is strongly hirsute. I have "found them under stones at very low tides," but have also known them drawn from water of considerable depth along with Thuiaria thuia. A more intimate and extensive acquaintance with this species induces me to question whether the individual described and figured in the 'Zoologist' for 1850, under the name of Ophiocoma parmularia, be after all a distinct species, and not rather a *variety* of the present one? It certainly appears to differ from the description of Mr. Forbes in all the particulars so minutely stated by our late lamented and esteemed friend the Rev. James Smith, of Monquhitter. Yet, apart from the wedge-shaped scales at the insertion of each ray, the chief distinctions or disparities being the form, number of plates, and the arrangement or rather number of spinules, these variations cannot, I consider, be said to be greater than are frequently found to exist between identical individuals of other species, particularly where the comparison has been instituted on examples gathered from localities widely apart; and though the scales at the origin of the rays certainly present, to the eye as well as under a lens, a wedge-shaped appearance in their general outline, which is owing obviously in part to colour, or perhaps more properly to the want of it, it is possible that, were the specimen broken up and carefully dissected, it might be found to have little if anything more peculiar in it, than could be accounted for by the fact of its being more numerously covered with plates, while at the same time less thickly set with spinules than is usual. To my mind, by far the most important feature lies in these wedge-shaped scales, and were this authoritatively ascertained, I should have no hesitation in regard to a distinction of species; but more extended opportunities of examining these *genera* satisfy me that a wider range of variation falls to be admitted in the identification of species, than can reasonably be claimed in the classification of most other forms of animal life.

On comparing examples of Ophiocoma rosula, gathered on this coast, with others from a distance, and particularly with one from Ayrshire, which I owe to the kindness of Major Martin, of Ardrossan, I find differences nearly as great as those above referred to. For instance, one set as compared with another, are fuller and rounder; some are deeply pentangular and others circular; some are strongly spinous and others very slightly so; and in some, again, the triangular plates cover about half the disk, while in others of average size these plates are so small or obscured, that careful inspection is necessary in order to become satisfied of their existence. However the matter may prove eventually, I feel warranted in submitting these observations, and am ready to afford every facility in my power with a view to its determination.

Ophiocoma rosula. After the above reference to this species, I need only observe that here, as elsewhere, it is very abundant, and of great variety of colour, as brown, red, pink, purple, variegated, &c. Perhaps the majority of the specimens obtained here last season were more or less pentangular in the form of the disk, but in this respect there appears to be little uniformity. Three very small, measuring only one-sixteenth of an inch across the disk, I was willing to set down to the account of Ophiocoma minuta; but surrendering my reserve to the better judgment of a highly valued and accomplished friend, whose name I have already had occasion oftener than once to write in the course of these observations, I place them under the parental care of this our familiar rosy friend.

George Harris.

Gamrie, Banffshire, November, 1852.

Proceedings of the Entomological Society.

November 7, 1853.—J. O. Westwood, Esq., Vice-president, in the chair.

The following donations were announced, and thanks ordered to be given to the donors:—The 'Zoologist' for November; by the Editor. The 'Literary Gazette' for October; by the Editor. The 'Athenæum' for October; by the Editor. The 'Journal of the Society of Arts' for October; by the Society. 'Revue et Magasin de Zoologie,' Nos. 7 and 8, 1853; by the Editor, M. Guérin-Méneville. A lithographic portrait of the late Dr. W. A. Bromfield, framed and glazed; by his sister, Miss Bromfield. Lists of the British Tineidæ, for marking the desiderata to the Society's Collection; by E. C. Buxton, Esq. A box of South American Lepidoptera, in the finest condition, and containing several new species; by Thomas Jones Stevens, Esq., of Bogota, Corr. M.E.S. A box of British Lepidoptera, including a hermaphrodite

Smerinthus Populi; by the Rev. Joseph Greene. Six specimens of Plutella Dalella; by the Rev. J. Johnson.

Monsieur Henri Jekel, of Paris, was balloted for and elected an Ordinary Foreign Member of the Society.

Mr. Curtis exhibited a box of rare Coleoptera from Mozambique, received from Signor Bertoloni, of Bologna, including a specimen of Goliathus Derbyanus.

Mr. Edwin Shepherd exhibited a new British moth, Noctua Sobrina, *H.-Schæf.*, and an apparently new species of Peronea; both taken this season in Perthshire by Mr. Weaver.

Mr. S. Stevens exhibited another specimen of Noctua Sobrina, and a remarkable variety of Trichius fasciatus, in which the dark markings of the elytra were run together into a blotch; both taken by Mr. Weaver, in Scotland. He also exhibited a box of Diurnal Lepidoptera, in the finest condition, captured in Nicaragua, and forwarded in paper envelopes, the wings being closed over the body. In this state they were packed into a small space, and travelled free from injury, requiring only to be relaxed and set.

Mr. Shield sent for exhibition a specimen of Depressaria subpropinquella, bred from a larva found feeding on a thistle; and a new Nepticula, of which the larva makes a peculiar centrifugal mine in the leaves of Rumex Acetosa, and hitherto found only near Dublin. Mr. Stainton intends to describe the species under the name of N. Acetosæ.

Mr. F. Smith exhibited living specimens of a South American ant, Odontomachus unispinosus, imported with some Orchidaceous plants, and given to him by Mr. Stevens.

Mr. Douglas exhibited leaves of Glechoma hederacea, bearing tubular galls on the upper side, formed and tenanted by larvæ of Cecidomyia bursaria, *Bremi.* These insects he had been able to identify by means of the Monograph on Cecidomyia, just published by Herr Winnertz, in the 8th volume of the 'Linnea Entomologica.' Mr. D. also exhibited a living larva of a Talæporia? from a fence near Croydon; and leaves of sallow in which were the mines of Lepidopterous larvæ (Nepticula) and of Dipterous larvæ (Phytomyza), almost identical in appearance.

Mr. Boyd exhibited Triphæna subsequa, Limacodes asellus, Macaria notata, Prodelia literalis, and varieties of Satyrus Janira and Argynnis Paphia, all captured in the New Forest.

Mr. Curtis exhibited parasitic insects taken from Malachius æneus, Epipone spinipes, Andræna Gwynana, Athalia lineolata, Bombus pratorum, and an Ammophila from Africa.

Mr. John Clifford, of Pimlico, sent a sample of pearl barley, destroyed by insects, which were now identified as Anobium paniceum and Ptinus ovatus. The Chairman remarked that the former of these insects had several times been reported to the Society as injurious to farinaceous substances.

Mr. T. Desvignes exhibited specimens of a new Ichneumon, reared from larvæ of Nonagria Typhæ and N. paludicola; and read a description of the species under the name of I. paludator.

Mr. Baly communicated "The Characters of Paralina, a new Genus of Chrysomelidæ," of which the type is Chrysomela Indica, *Hope*.

Mr.. Westwood exhibited his original sketch of a moth taken at Ballymena, in Ireland, by Mr. Templeton, and mentioned in Westwood and Humphreys' 'British

Moths,' (vol. ii. p. 67). Mr. Stephens had inserted the species in the Museum Catalogue under the name of Dasydia torvaria; but Mr. Westwood was now of opinion, from reference to Duponchel's figure and description, that it was Cleogene Peletieraria. Mr. Westwood also exhibited some larvæ in a bottle, which, from the locality of their capture on the coast, near Dublin, he thought might be those of Diglossa mersa.

Mr. Smith exhibited the same Anthophorabia he brought to the last meeting, still alive; also larvæ of Anthophora retusa, covered with larvæ of Anthophorabia and Monodontomerus, both apparently parasitical thereon: and he read a series of observations on the structure and œconomy of Anthophorabia. The chairman referred to the unprecedented circumstance of an insect without reticulated eyes possessing ocelli, as Mr. Smith was positive is the case in this instance; and Mr. Newman noticed, as most rare among insects, the fact reported of the male pairing consecutively with several females, and still surviving. Mr. Waterhouse, Mr. Curtis, and Mr. Hudson also made some remarks on the subject.

Mr. Wallace read the commencement of a paper "On the habits of the Butterflies of the Amazonian Valley," which will be resumed at the next meeting.—*J. W. D.*

Proceedings of the Society of British Entomologists.

October 4, 1853.—Mr. Harding, President, in the chair.

The President exhibited the following insects: — Exæretia Allisella, taken on the sand-hills near Sandwich, Kent, being a new locality, Mr. Allis having captured this insect in Cumberland; Sphaleroptera ictericana, with the pupa and case, the larva having fed on the flowers of the mouse-ear hawkweed, (*Hieracium Pilosella*); Sciaphila Perterana, with pupa and case, the larva having fed on the flowers of the great white ox-eye (*Chrysanthemum leucanthemum*); Depressaria Alstrœmeriana, with the pupa and case, the larva having fed on the flowers of the common hemlock (*Conium maculatum*).

The President said a specimen of Sphinx Convolvuli was taken near his residence in Shoreditch; and that another was brought to him at Darenth Wood, having been picked up in the road: he also stated that he had taken a splendid pair of Notodonta dictæoides near Dartford, and Hadena lutulenta at Darenth Wood.

November 1, 1853.—Mr. Harding, President, in the chair.

The President read an extract from a letter received from Mr. Oxley, in Australia, in which the writer says, — "My man Jemmy had a large blue-bottle blow in his ear, and was nearly distracted for days, until I discovered the cause, and extracted seven large larvæ."

The President exhibited a beautiful variety of Ephyra Porata, and a singular variety of Argynnis Euphrosyne, taken in Hainault Forest; likewise a variety of Callimorpha dominula, the black marks on the inferior wings being obliterated and replaced by yellow ones. He also stated that he had taken some fine specimens of Aporophila australis, Leucania crassicornis, Calocampa vetusta, with several Peroneæ, and a Gelechia not named, near Deal, in October. The President also stated that a friend of his had bred several specimens of Spilosoma papyratia, *Ste.*, during the month of October.

Mr. Dalman exhibited some rare beetles, among which were Helops pallidus and Micronyx tibiale, taken on the Kentish coast by Mr. Harding.

Mr. Miller read the following paper on the habits of Elachista Cerussella:—

"The larvæ of this insect I found about the middle of the months of June and August, feeding on the inner substance of the leaves of a coarse kind of grass or sedge, the name of which is unknown to me, on which they spin a slight cocoon, and change to the pupæ. These pupæ appear alike in all respects, except in point of size and colour. I have not had an opportunity of observing, but suppose the light-coloured moth to be produced from the larger, and the dark-coloured one from the smaller pupæ. There is no perceptible difference in the larvæ, nor, except in size and colour, in the pupæ; therefore, taking this into consideration, together with the very great resemblance presented by the perfect insect under the microscope, I think I am justified in considering them one and the same species. I took both larvæ and pupæ at the same time, and bred them two days afterwards. The dark one, or male, is not generally known, and is only to be obtained by breeding the females. Mr. Harding informs me it is common in the fens."

The specimens exhibited were bred. The Ichneumon infesting the larvæ was also exhibited.

The President announced the following donations for the cabinet:—From Mr. Edleston, a specimen of Plusia bractea and some others; from the Rev. J. Johnson, six specimens of Plutella Dalella.—*J. T. N.*

NOTICES OF NEW BOOKS.

'*A History of British Crustacea.*' By THOMAS BELL, F.R.S., Pres. L.S., &c. &c. Part IX., completing the work. London: Van Voorst. October, 1853. *Price* 2*s.* 6*d.*

THE publication of this work has been a most tedious affair,—it has been spread over eight years: and we wish to enter our strong protest against publishers or authors commencing periodical publications of any kind, with the *self-imposed* terms of which they are not fully prepared to comply. Exceptions to the rule of punctuality may possibly occur: illness, death, or other unforeseen interruptions, cannot be guarded against; but in the present instance no such interruptions have occurred, and no kind of explanation is offered. This is a more serious subject than it may at first appear, because the want of punctuality in serials of any kind begets a distaste in the purchasers of such publications; and the proprietors of all periodical literature are more or less injured by the shortcomings of any one of their number.

From these observations, imperatively called for but penned with great reluctance, we turn with pleasure to the work itself, which is admirably executed, and a long-desired addition to our Natural-History literature. This last part, containing the Introduction, is the most valuable of all, and we particularly commend to the close and studious attention of our readers the following most interesting passage on the metamorphosis of the Crustacea.

"One of the most marked characters by which this class was long considered as distinguished from that of insects, was the supposed absence of any such change of form, during the progress of development after exclusion from the egg, as is ordinarily understood by the term *metamorphosis*: and Dr. Leach, in his definition of the class, formally adopts this character, which has been repeatedly recognised by others.

"It was in the year 1823, that Mr. Vaughan Thompson, whose name is now identified with the discovery, following up an observation made by Slabber, a Dutch naturalist, as long ago as 1768, and published ten years afterwards, established the remarkable fact that those anomalous forms which constituted the genus Zoea of Bosc, are nothing more than the early or larva condition of the higher Crustacea. It will readily be imagined that no small excitement was produced in the scientific world by the announcement of a discovery which, followed up, as it afterwards was, with equal intelligence and perseverance, and with corresponding success, may claim for its author a place amongst the few observers who, from a single phenomenon, have been led to the establishment of generalisations and laws of the highest importance.

"Notwithstanding, however, the credit is due to Mr. Thompson of having carried out the suggestion to its full development, it was undoubtedly to the Dutch naturalist that he was indebted for the ascertained fact that the anomalous creatures on which Bosc afterwards founded his genus Zoea pass by metamorphosis into a different and a higher form.

"Before I proceed with the further history of this discovery, I think it right to show the grounds of Slabber's claim, which had been wholly overlooked as to its results, and which, in consequence of an error arising from deficient information, Mr. Thompson himself, in the first place, much depreciated, without, as far as I am aware, having afterwards taken any opportunity of correcting the misapprehension. It was, then, in the year 1778, that Slabber published a small work, in which occurs a description with figures of a new crustacean animal (fig. *a*), to which the name of Zoea Taurus was afterwards given. Having taken at sea several specimens of this singular creature, he placed one of them (*a*) in sea water, which he constantly renewed, for the purpose of observation, and, 'on the third day, finding its movement become slower and its colour paler, he subjected it to the microscope, and found to his surprise that the anterior part of the animal had changed its form, and on the fourth day it had acquired the appearance represented in fig. *b*, so that, together with the other individuals he had taken, it seemed to have experienced a complete metamorphosis; under this new form the dorsal spine had disappeared, the front spine had become comparatively small, the antennæ were rendered conspicuous, the feet and eyes were apparently more developed, and the tail had changed from forked to spatulate, fringed by a row of thirteen short spines.' It would certainly seem that this plain and simple statement, supported as it was in many respects by Mr. Thompson's own subsequent observations, can scarcely justify the conclusion to which that gentleman is led, 'that Slabber lost his Zoea, in changing the sea water, and that the new form came from the added portion.' But the truth of Slabber's statement, and, consequently, the evidence of the correctness and originality of his discovery, are very strongly proved by the almost absolute identity of the second form of his animal with that of several species subsequently observed; and particularly of the ditch-prawn (*Palæmon varians*), as figured by Capt. Du Cane.

"It was, however, from this observation of Slabber that Mr. Thompson, in the year 1823, was induced to carry out the investigation. In the spring of the previous year, as he informs us, in the harbour of Cove, he first met with Zoeas, and that in considerable abundance; and 'in the year following, at the same season, one of considerable size occurred, amongst a number of smaller ones, and, judging it full grown, he considered it a fit subject to keep for the purpose of witnessing the *metamorphosis observed by Slabber*,' &c. The metamorphosis was interrupted by the death of the animal when in the act of undergoing it; but it had advanced sufficiently to show that the animal belonged to the Brachyura, and the portion which was observed, contained all the five feet on one side, the anterior foot being furnished with a perfect claw; and it appears now more than probable that the form into which it was passing was that of Megalopa, to which further reference will be presently made.

"Here, then, was the first decided demonstration; but any doubt which might be supposed to appertain to an incomplete fact, was shortly removed by Mr. Thompson's success in hatching the ova of the common crab (*Cancer Pagurus*), the product of which were true Zoeas.

"Subsequent observations made by Mr. Thompson confirmed his new views, and he established the truth of a metamorphotic change in several genera; the results of his researches being given to the world in a subsequent portion of his "Zoological Researches," in the 'Entomological Magazine,' in 'Jameson's Journal,' and particularly in a paper read before the Royal Society in 1835, and published in the 'Philosophical Transactions,' in which details are given of the complete changes in the common shore crab (*Carcinus Mænas*), which establish the further interesting and important fact, that while the animal appears under the aspect of a Zoea on its first exclusion from the egg, it undergoes a further change into a true Megalopa before its final assumption of the perfect form: showing that this supposed genus also, which was formed by Leach, is, like Zoea, only a phase of a higher type. Thus, in its progress from the egg to its final development, the brachyurous crustacean was proved to pass through two temporary conditions, which had previously been regarded as types, not of genera only, but of different families; and both strikingly dissimilar from the group to which, in its perfect state, it really belongs.

"The new doctrine was not received at once with implicit assent. Mr. Westwood, in a paper read before the Royal Society in June, 1835, not only contests the universality of the law, which Mr. Thompson had somewhat too hastily, perhaps, deduced from his facts, but concludes that that gentleman's views are erroneous, and that '*no exception* occurs to the general law of development in the Crustacea —namely, that they undergo no change of form sufficiently marked to warrant the application to them of the term metamorphosis.'

"This hasty, and, as the result has proved, very premature condemnation, derived some *primâ facie* supports from the elaborate investigations of Rathke on the development of the embryo in the ova of the river cray-fish (*Astacus fluviatilis*), and the subsequent observations of Mr. Brightwell on that of the lobster, which latter, however, have since been only partially verified by Rathke, and are, indeed, modified in some particulars by Mr. R. Couch. To these I shall have occasion to refer more particularly hereafter; it is sufficient now to observe, that in both instances the animal was stated to be perfected by gradual development, and not by any sudden change of form.

These, if even the statements were fully borne out, have since been proved to be merely exceptional cases; and not only is Mr. Rathke's assumed general support of Mr. Westwood's objections completely removed, but that distinguished physiologist himself volunteers his strong testimony in favour of the opposite views in a subsequent paper, in which he says that he hastens the publication of these new researches respecting the development of several other forms of Crustacea, *one of which is the lobster*, 'in order, as soon as possible, to record a testimony to the correctness of Thompson's discovery, that even the Decapods, after they have already quitted the egg, undergo a very considerable metamorphosis;' and, in conclusion, he adds, 'from the notices which I have here briefly communicated respecting the development of some Decapods, it results that several of these animals, as first discovered and described by Thompson, undergo a very considerable and highly remarkable metamorphosis. . . . . I, therefore, confess that I have done Thompson injustice in not putting faith in that discovery.' And he then states his intention, 'next spring, partially to subject his researches on the cray-fish to revision.' There is one apparent anomaly, however, on which Mr. Westwood dwells with some plausible show of reason, and on which it may be well to offer a few remarks.

"Amongst the specimens of Crustacea, preserved in spirits, which formed part of the collection of the late Rev. Lansdown Guilding, and which came into my possession after his death, was one of the abdomen of a female land crab (*Gecarcinus*), to which were attached numerous young, in their perfect form, and very similar, excepting in size, to the parent. Here, then, was a case in which, it may at once be granted, no *external* and independent metamorphosis, at least, had taken place; and on this, with the other instances above alluded to, Mr. Westwood founds his principal argument against the doctrine enunciated by Mr. Thompson. But may not this probably be an analogous phenomenon to that of the land salamanders amongst the Amphibia? And, as in that instance, where the animal has no opportunity of depositing her eggs in the water, where, in the more typical forms, the young undergo the transformations essential to the whole group, the changes take place in the oviduct; so may not the young of the land crab, whose habits require them to be speedily in a condition to leave the coast where they are hatched, formally undergo the metamorphosis within the egg? This being granted, it would be as reasonable to deny the phenomenon of transformation in the Amphibia generally, because the young of the salamander are brought forth in the perfect state, as to deny its occurrence in the Crustacea, on the analogous exceptional case of the terrestrial Gecarcinus.

"I do not consider it necessary to examine at any detail the 'six arguments' which Mr. Westwood adduces 'against the metamorphosis into crabs which the Zoeas are stated to undergo,' since the facts, exactly as related by Mr. Thompson, have been so fully confirmed by subsequent observers. Indeed, I prefer referring to the whole of Mr. Westwood's elaborate examination of the question, for the information of those who may have the curiosity to see how much may plausibly be urged against the truth of a theory, so irrefragably supported by facts. It is sufficient to say that Mr. Westwood does not attempt to bring forward a single investigation or observation of his own in support of his views, with the exception of that of the land crab, already mentioned.

"But Mr. Westwood was not the only one who demurred to the correctness of Mr. Thompson's conclusion. In the first volume of Milne-Edwards's admirable 'History of Crustacea,' this author says, 'Les Decapodes paraissent tous naître avec la série complète de leurs anneaux et leurs membres;' and in a note occurs the following opinion on the earliest researches of Mr. Thompson: — 'Suivant M. Thompson, les Decapodes éprouveraient de véritable métamorphoses, car ce naturaliste regarde l'animal connu sous le nom de Zoé comme étant le jeune du crabe commun de nos côtes. Mais cette opinion n'est pas étayée d'observations assez précises pour entraîner la conviction.'

"It is remarkable that this distinguished naturalist's ultimate convictions were derived from his own observation; and it is difficult to account for such a discrepancy when we consider the high character of the dissentient, and the means which were placed in his hands for determining the question; for in consequence of the interest which it excited amongst the scientific men of France, Dr. Milne-Edwards was deputed, with another naturalist, to repair to the Isle de Rhé, for the express purpose of settling the disputed point, and he arrived, as we learn, at the conclusion above stated.

"Subsequently to the researches above mentioned, the late Capt. Du Cane investigated the development of the shore crab (*Carcinus Mænas*), and of the ditch prawn (*Palæmon varians*), with complete success; establishing in each of these forms the truth of Mr. Thompson's position. Mr. H. Goodsir also examined, with similar results, the former species. But by far the most complete illustration of the subject, and the most extensive proofs of the general law, are afforded by the researches of my friend, Mr. Richard Q. Couch, of Penzance, who, dissatisfied with the uncertainty and contradiction of former testimony, resolved to investigate the matter for himself; and this he effected with a degree of acumen and perseverance which characterize all his researches, and by which the truth of the doctrine is fully established, as regards the genera Cancer, Zantho, Pilumnus, Carcinus, Portunus, Polybius, Maia, Galathea, Homarus, and Palinurus,—a goodly number to have been investigated by one observer,—and of some of these he watched every change. These results were published in two Memoirs, read to the Cornwall Polytechnic Society in 1843; in which the author takes a clear and fair view of the whole subject, and comes to his decision with a host of evidence sufficient to set the substantive question entirely at rest. Unfortunately, the useful local publication in which these Memoirs appeared, is so much confined in its circulation, that it has probably fallen into the hands of but few naturalists.

"I have felt it desirable to give a more extended history of the discovery, as, with the exception of Mr. R. Couch's first Memoir just referred to, no such digest has ever been placed at one view before the world. I now proceed to examine the actual results, and to endeavour to reduce the facts already known to some order.

"It will be inferred from the previous account, that there are considerable variations in the character of the metamorphosis of different families, and that in the case of Astacus fluviatilis, there appears at present to exist even an abrupt and isolated exception to the general law. As this is the only case at present in which such exception has been established, I refer my readers for further information on this subject, to the work of Mr. Rathke himself, which constitutes one of the most complete and elaborate monographs in existence, illustrated in the most beautiful and perfect manner; and to the full and satisfactory analysis of the work by Milne-Edwards, in the first volume of his 'History of the Crustacea.'

"Eliminating, therefore, this exceptional case, it will be found that the fact of a metamorphosis has been demonstrated with more or less success in no less than seventeen genera of the brachyurous order of the Decapoda—in which order the phenomenon is most decided and obvious—belonging to the families Leptopodiadæ, Maiadæ, Canceridæ, Portunidæ, Pinnotheridæ, Grapsidæ, and Gecarcinidæ. In the Anomourous order, it has been shown in the genera Pagurus, Porcellana, and Galathea, and amongst the Macroura in Homarus, Palinurus, Palæmon, and Crangon."—Introduction, p. xxxviii.

'*The Natural History of the Birds of Ireland, indigenous and migratory, containing Descriptions of the Habits, Migrations, Occurrence, and Economy, of the two hundred and sixty-one Species comprised in the Fauna.*' By JOHN J. WATTERS, Associate Member of the University Zoological Association. Dublin: John M'Glashan. London: W. S. Orr & Co. 1853. 300 pages, 12mo.; no illustrations. *Price 5s.*

WE believe that we shall be doing the author of this work the most acceptable service by quoting entire his explanatory Preface. We can only add that we rejoice in every attempt to make known the Natural-History riches of Ireland.

"The present 'Natural History of the Birds of Ireland' has been the result of many years' observation of their habits. Collecting and arranging that information, I have ventured, with considerable diffidence, to place it before the public. The late William Thompson, Esq., of Belfast, whose friendship I for many years enjoyed, on various occasions expressed a desire to see a cheap work on the subject published, regretting at the same time the unavoidable expense attending his own, which had prevented its circulation to the extent expected.

"For the purpose of making this book as popular and comprehensive as possible, many scientific technicalities have been left out, as tending to confuse the general reader without conferring any additional information, whilst such generic or specific names, essential to the subject, have in every instance their English signification attached. Intended to be within the comprehension of the *general reader*, it is hoped at the same time to be as available to *students*, and particularly to persons commencing or pursuing this branch of Natural History: for that purpose many details will be found through the work, recording the occurrence of the rarer visitants to our island, and in every instance specifying the habitat or country they are indigenous to. This arrangement might have been difficult were it not for the assistance afforded by the works of Temminck, Degland, and Schlegel, together with those of other distinguished naturalists, whose information is acknowledged in the text. Mr. Thompson's work has afforded me considerable facility in referring to notices of species which I had previously transmitted to him, which was fortunate, as in many cases I had no copy except what occurred in my correspondence with that gentleman, and which he has so amply acknowledged in his work.

"For the further information of the student the modern French scientific names have been added, together with a carefully revised and copious index to the systematic names in both languages; whilst in several instances notices have been introduced of the appearance of the same species in other countries, for the purpose of illustrating some peculiarity of habit not observable in our own.

"For the better economy of space and consequent saving of expense, I have omitted a description of the plumage of the birds, preferring to give a familiar description of their habits and migrations rather than to occupy the work with a quantity of matter not sufficiently attractive to the general reader."

'*The Annals and Magazine of Natural History.*' *No.* 71, *dated November*, 1853. London: Taylor & Francis, Red Lion Court, Fleet Street. *Price* 2*s*. 6*d*.

THE papers in this number are as follows: —

'On the Nucleus of the Characeæ.' Translated by Mr. A. Henfrey from the original of Al. Braun.

'On the Branchial Currents in the Bivalves.' By William Clark, Esq.

'On Preserving the Balance between the Animal and Vegetable Organisms in Sea Water.' By Robert Warington, Esq.

'On the Cornbrash of the Neighbourhood of Cirencester.' By James Buckman, F.L.S., F.G.S., Professor of Geology, Royal Agricultural College.

'On the Teeth of the Pneumonibranchiate Mollusca.' By J. E. Gray, Ph.D., F.R.S., V.P.Z.S.

'On the Mechanism of Aquatic Respiration, and on the Structure of the Organs of Breathing in Invertebrated Animals.' By Thomas Williams, M.D. Lond.

Proceedings of Societies: — Zoological.

Miscellaneous: — Spadix purpurea; by W. P. Cocks. Note on the Parasitism of Comandra umbellata; by Asa Gray. Rare Irish Mollusca; by William White Walpole. Natica sordida; by the same.

With respect to these valuable papers we have scarcely any comments to make. That most interesting to zoologists has been kindly transmitted by the author, Mr. Warington, for publication in these pages, (see Zool. 4118). Mr. White Walpole's brief notice of "Rare

Irish Mollusca" is contained in the more detailed and comprehensive paper by that acute and indefatigable naturalist in a prior number of the 'Zoologist,' (see Zool. 4101). This gentleman's note on Natica sordida states that specimens of that rare mollusk were obtained by him this summer off the Irish coast, by trawling in about 60 fathoms water: in company with this shell was Fusus propinquus. The same two mollusks have also been found in company off the coast of Wexford; and Dr. Melville has found them in close proximity off the Isles of Arran, in Galway Bay.

'Shells and their Inhabitants. The Genera of Recent Mollusca arranged according to their Organization.' By HENRY AND ARTHUR ADAMS. Part VII. London: Van Voorst. November, 1853. *Demy 8vo., with the plates plain, price 2s. 6d.; Royal 8vo., with the Animals coloured, price 5s.*

THIS part contains 32 pages of text and 4 plates, and comprises the under-mentioned genera: — Volvaria, *Lamarck*; Dolium, *Browne*; Cadium, *Link;* Ringicula, *Deshayes;* Sycotypus, *Browne;* Velutina, *Fleming;* Lamellaria, *Montagu;* Cryptocella, *Adams;* Marsenina, *Gray;* Coriocella, *Blainville;* Natica, *Adanson;* Lunatia, *Lamarck;* Neverita, *Risso;* Ampullina, *Lamarck;* Ruma, *Chemnitz;* Mamma, *Klein;* Naticina, *Gray;* Catinus, *Klein;* Amaura, *Moller;* Cassis, *Browne;* Semicassis, *Klein;* Cassidea, *Link;* Levenia, *Gray;* Sconsia, *Gray;* Galeodea, *Link;* Morum, *Bolten;* Scala, *Klein;* Cirsotrema, *Mörch;* and Acus, *Humphrey.*

The figures representing the shell and animal in their relative positions to each other are remarkably satisfactory, and do the artists, who are also the authors, infinite credit.

Anecdote of a Cow sucked by two Hedgehogs. — Having recently heard that my relative, Mr. T. F. Buxton, of Leytonstone, Essex, had met with an instance in which the old opinion on the above subject appeared to be verified, I wrote to him to request information respecting it; and I beg to forward his reply, together with a statement made by his servant, for insertion in the 'Zoologist.'

Extract of a Letter addressed to Mr. J. H. Gurney by Mr. T. F. Buxton, of Leytonstone, in Essex, dated November 9, 1853.—" One evening in the course of the summer I heard, several times repeated, a noise as of a blow on the iron palings of my field, and sent my stable-boy with a lantern, to ascertain the cause. On his return he told me that he found a cow lying near the palings, and two hedgehogs sucking her. He made the cow get up, but the hedgehogs remained suspended to her till he knocked them off with a stick. He kicked them about in a vain attempt to kill them. I have no reason to doubt the boy's statement: he is an intelligent lad of sixteen, and I have never known him tell a falsehood. The movements of the lantern, which I observed from the house, entirely corresponded with his account."

Statement of Mr. Buxton's Servant, dated November 9, 1 53. — " One evening in the month of July Mr. Buxton heard a noise in the field. Then I was sent to see what was the matter. I went half way through the field, and then I came to the old cow, which was laying on her left side and moaning, and two big hedgehogs sucking her milk. When they saw my light, then they bit her, and made her get up, then she began to kick at the fence, till I got a stick and knocked them off. I kicked them down the field some distance but did not kill them. They were about twenty minutes from the time Master told me till I got them off. I dare say they would have sucked her dry."

—*J. H. Gurney ; Easton, Norfolk, November* 11, 1853.

List of Micro-Lepidoptera taken in the Vicinity of Dublin during the year 1853.— The Hill of Howth is the locality where the following captures were made, unless otherwise expressed : —

Tortrix icterana, July.
Peronea rufana, hedges by the side of the old road, September and October.
  „ favillaceana, larvæ under beech-leaves in a fine web, plantations on the hill, July.
Spilonota Roborana, larvæ on sweet briar (*Rosa rubiginosa*), May.
Sericoris cespitana, littorana, and lacunana, July.
Cnephasia musculana, larvæ on brambles, Enniskerry, September.
Phoxopteryx Lundana, May.
Semasia spiniana, August.
Coccyx Vacciniana, May.
Catoptria Hypericana, Enniskerry, July.
Argyrolepia Badiana, July.
Cochylis Francillana, July.
Eudorea lineolea, larvæ under the yellow canker-moss on old blackthorns, June, (Zool. 3778).
Homœosoma nimbella, larvæ in the seeds of wild chamomile, August.
Tinea fuscipunctella, in the house, Dollymount.
Depressaria atomella, July and August.
  „ assimilella, July.
  „ Alstrœmeriana, gardens at Dollymount, August.
  „ subpropinquella, larvæ under leaves of thistles, in a light web, June.
Gelechia fraternella, larvæ on Stellaria uliginosa, May, (Trans. Ent. Soc. n. s. vol. ii. p. 77, pl. 10, f. 3).
  „ Næviferella, July.

Röslerstammia granitella, July.
Argyresthia spiniella, in mixed underwood, August.
Coleophora Alcyonipennella, larvæ on Centaurea nigra, April and May, (Trans. Ent. Soc. n. s. vol. ii. pl. 11, f. 2).
„ discordella, larvæ on Lotus corniculatus in May, (Zool. 4026).
Gracilaria inconstans, larvæ on alders, June and October.
„ Tringipennella, larvæ mining the leaves of plantain, April and July.
„ auroguttella, April and July.
Nepticula margincolella (*Stainton*), n. sp., larvæ in elm-leaves, October.
„ Acetosæ (*Stainton*), n. sp., larvæ in the leaves of Rumex Acetosella, July, October, and November.
Lithocolletis trifasciella, October, November, and December.
—*Richard Shield; 6, Fleet Street, Dublin, November* 12, 1853.

Snakes with Two Heads.—A few days ago a collection of animals belonging to Mrs. Wombwell made a short stay in this town, and the proprietress circulated handbills, describing, among other novelties, "a group of *double-headed Snakes*," a portion of one of which I inclose. Of course, the announcement of so extraordinary an anomaly aroused my curiosity, and I went to see this strange reptile, "with," to use the words of the keeper in describing it, "a head at each extremity of the body, the scales running both ways towards the middle, where the vent is situated." I endeavoured, but in vain, to obtain a close inspection. The reptiles were kept in a tin box, and when exhibited, the lid was opened, a quantity of old furs taken out, and one of them seized by the middle with a long pair of tongs, and thus held writhing over the heads of the spectators. The one I saw was just shedding its skin, and parts of the body from which it had separated were dark brown and moist-looking. Both extremities were thick and rounded, and from one I distinctly saw a tongue protruded several times: the other was much obscured by folds and fragments of old skin, which the keeper declared covered another head; but, from the manner in which the reptile was held up, and the respectful distance we were compelled to maintain, it was impossible to determine satisfactorily whether he spoke truth or not. My own conviction is, that the double head is, at most, *apparent*. If I am right, I think it very proper that such an attempt to impose on the credulity of the public should be exposed: if I am wrong, creatures so extraordinary should certainly not be suffered to remain inmates of a travelling menagerie. I may mention that the keeper related fearful instances of their deadly venom. A young rattlesnake, bitten by one of them, died in three minutes; a sparrow was swelled in a short time by the poison to the size of a pigeon!—*Jno. R. Hawley; Hall Gate, Doncaster, November* 1, 1853.

German Association for the Advancement of Science.

The German Naturalists and Physicians held their thirtieth meeting this year at Tübingen, on the 18th ultimo. It was attended by about 580 members, including a moderate sprinkling of French and Russians, two Americans, and a few English.

The meeting at Tübingen was not so numerous as that last year at Wiesbaden. Tübingen, though offering considerable attractions, by its situation in one of the finest parts of Swabia, by its scientific institutions, and by its reputation as a University, is not yet connected with the great European railway net; and people do not like travelling now in slow mail-coaches even for a day. Another cause was, that the President, Professor Hugo von Mohl, elected last year, did not do his duty. For reasons best known to himself, he did not appreciate the honour which the votes of nearly 1000 scientific men from all parts of the world had conferred upon him. Instead of endeavouring to further the object of the Society, he tried everything in his power to prevent the meeting from being held at all; and when he found that the patriotism of his townsmen did not allow them to go the same way with himself, he departed for Italy, leaving the whole business to be arranged by the Vice-President, Mr. Bruns, Professor of Medicine at Tübingen. Professor Bruns, much to his credit, took up the matter warmly, and so thoroughly succeeded in arousing the interest of the University and the towns of the neighbourhood, that the reception of the learned guests was of the most cordial nature. Tübingen itself had a very festive appearance. Outside the gates of the city triumphal arches, with streamers and flags floating upon them, had been erected, and within, nearly every house was decorated with garlands of oak-leaves and gay flowers; whole spruce-trees had temporarily been planted before some of the buildings, and even in the dwellings of the humbler classes of inhabitants, attempts—aye, and some very successful ones—had been made to do something towards showing that the strangers were heartily welcome. It is unnecessary to develope the effect which such a reception produced upon the meeting; every one seemed to be happy, and at the first general dinner there was such a profusion of spirited speeches and toasts as are seldom heard on similar occasions. Preserving the scientific form, and moving only within the bounds of scientific terminology, several of the speakers told their audience some very amusing things of every-day life, and caused a great deal of laughter. Quenstedt, the geologist, and Veesenmeyer, the botanist, succeeded in rousing the merriment of the party to the highest pitch. On the 21st of September an excursion was made to Rottenburg, an ancient Roman town, and thence to the Niedernau, a modern watering-place. There were no less than 600 carriages, including cabs, omnibuses, and mail-coaches. In Rottenburg the naturalists were received by the Lord Mayor and Corporation. The principal street was most ingeniously ornamented; about 6000 hop-poles, with the graceful creeper around them, had been erected at suitable distances from each other, thus forming a complete avenue. The appearance they presented contrasted charmingly with the venerable old buildings, and the bright sun, the sweet smell of the hop, the flags and festoons, the music, the friendly faces of the inhabitants, the numerous huzzas, and the waving of handkerchiefs, formed altogether a scene of a very impressive kind. In Niedernau, where, after leaving Rottenburg and passing several villages, the carriages arrived, a good dinner was waiting, the President of the Society being aware that no one descended from Teutonic stock considers a festival complete without something substantial to eat. At dinner, the health of Uhland and Justinus Kerner was drank. The presence of these two old poets, who have both endeared themselves by their patriotism to their countrymen, and have done so much towards making German literature what it is, called forth the greatest enthusiasm, which was the more real in a district which their writings have rendered classical ground, and where one cannot look at a ruin, or visit a town, that is not already associated in one's mind with some popular ballad or romance of these men. On the 23rd of September, an excursion was made to Reutlingen, formerly one of the free Rix-cities, but now a manufacturing town belonging to Wirtemberg. In the time of the last revolution, a great political meeting was held here, which gave rise to the fearful struggle in Baden. On the day mentioned, it presented a very peaceable appearance. On passing the boundaries of the town, the naturalists were received by two heralds on horseback, in the costume of the middle ages, both holding banners in their hands. The one was dressed in the colours of Reutlingen: the other in those of Germany—black, red, and gold. Just outside the city gates there was a triumphal arch, and the cathedral and all the steeples of the churches were profusely decorated with flags and streamers. The weather was beautiful. In one of the public gardens the dinner table had been spread in the open air, where at least 1500 people sat down. During dinner a well-conducted band kept playing. A fine effect was produced by a chorus of singers, consisting of peasants, both men and women, of the neighbouring district; they were all dressed in their native costume, and, headed by a fine looking fellow of their party, who carried their banner, they marched around the table at which the naturalists were sitting. After dinner, most of the party paid a visit to the Achalm, the ruins of a castle mentioned in one of Uhland's ballads. The view from thence was charming. The vineyards surrounding the ruin, the town of Reutlingen, the rivulets, the distant chain of mountains, with its old feudal castles, formed a pleasing panorama, and amply repaid the exertions of those who, after taking in a hearty dinner, and letting the wine-bottle pass freely, had climbed the summit. In returning about eight o'clock in the evening to Tübingen, there was a firework on the top of the hill on which the castle is built. It produced almost a magical effect to see the old Gothic building illumined by the different coloured fires, and the numerous rockets, with their blue, red, and white nuclei, shooting up into the sky. In short, there was plenty of amusement during the whole time of the meeting. Balls, concerts, dinner-parties, alternated with each other; there was even once, so as to give a notion of German student-life, a representation of a "Kneipe," in which grave professors, throwing aside for a while all reserve, acted the part of students and freshmen.

The scientific part of the meeting was equally satisfactory. In the three general or public sittings none but subjects treated in a popular manner were this time admitted, and all papers that could in the least offend the ear of ladies had been strictly rejected,—a laudable restriction, probably adopted in consequence of the complaints made by the press that medical subjects not intended for any but medical men had been brought forward. One of the first speakers was Jaeger, of Stuttgart, who gave a brief account of the last year's labours of the Imperial L. C. Academy of Naturalists, detailing that, as the first German institution, it had assumed the protectorship over the Societies of German Physicians at Paris and New York, that it had asked for three prize essays, and that the King of Wirtemberg had shown his good will towards the Academy by presenting it with a sum of money, to be devoted to scientific exploring expeditions. Schultze, Bip., read an interesting paper 'On the Development of the Natural Sciences from the Middle of the Sixteenth Century until the Middle of the Nineteenth.' He assumed three periods:—1st, The period when knowledge was handed down by oral tradition; 2nd, When it was propagated by writing; and 3rd, When perpetuated by printing. The present time he looks upon as the commencement of a fourth period, when, by the intimate international intercourse and the power of steam, knowledge is rapidly diffused. Dove, of Berlin, gave a comprehensive account of the present state of meteorology, and a very clear explanation of the causes which determine the weather of Europe. Carnal spoke on the importance of salt, gold, and coal,—three monosyllables playing an important part in the affairs of the world. He complained of the ignorance prevailing in England on the subject of German coal, and quoted a conversation he had with an Englishman of some scientific standing, who asked him whether there were any coal in Germany?—a question he answered by stating that not only had Germany enough coal for her own use, but could supply England and all the world, at the rate coal is now used, for 500 years to come. Fraas gave an account of the oldest inhabitants of the Swabian Alps. It appears that a few years ago fossil teeth were found which some at once declared to be those of man. This determination, however, was called into question, as no human teeth of the mammoth period had ever been fonnd in any part of the globe. Again, these teeth were exhibited last year in Wiesbaden, by Jaeger, when they were generally admitted to be human teeth; one was even sent to Owen, who agreed with the Wiesbaden meeting in pronouncing them to belong to man. The discovery of several almost perfect skulls has set the matter finally at rest: there was a race of men living simultaneously with the mammoth and other huge antediluvian animals. Gumbel read a paper on Mosses, explaining their importance in the economy of Nature, their great use to man, with whom they appeared together upon the earth. Veesenmeyer gave a spirited sketch of the Kirguises, and with a power of language reminding one of Humboldt's 'Views of Nature,' he described their relation towards plants and animals.

The sectional meetings were well attended. In the section for Chemistry and Pharmacology there were Fehling, Schlossberger, Leube, Babo, Weidenbusch, Ammermuller, Fresenius, Weltzien, H. Rose, &c.; Fehling and Rose alternately presided. In the section for Mathematics, Physics, and Astronomy, we noticed Wolfers, Osann, Reusch, Dove, Holtzmann, Gugler, &c,; Dove and Osann presided. The section for Medicine and Surgery counted the largest number of members. We may mention Ritter, Virchow, Heyfelder, Erlenmeyer, Fraas, Vierodt, &c.; Virchow was elected President. The Botanical section counted amongst its members Martens, Veesenmeyer, De Bary, Steudel, Schnitzlein, Hochstetter, and elected Schultz, Seemann, and Gumbel Presidents. The section for Anatomy, Physiology, and Zoology was attended by Luschka, Ecker, Focke, Wutzer, and was presided over by Rapp. The section for Geology, Mineralogy, and Geography was represented by Carnal, Quenstedt, Strombeck, Glocker, Desor, Gerlach, Stocker, &c., and elected Merian President.

The Imperial L. C. Academy of Naturalists, which may be looked npon as the nucleus of the Society, held two sittings under the Presidency of Professors Jaeger and Heyfelder. Dr. Nees von Esenbeck, the President, was unfortunately prevented by illness from attending. In a letter of his addressed to Jaeger he gave a favourable statement of the affairs of the Academy, showing that there were at present a greater number of first-rate scientific papers for publication in the 'Nova Acta' than at any former period. The topics of discussion referred chiefly to the affairs of the Academy, and have not yet been made public.

On the 24th of September the meetings were finally closed. Göttingen was chosen as the place of meeting for 1854, and Professors Listing and Baum were elected Presidents of the Society.—*From the 'Literary Gazette,' October* 22, 1853.

According to the 'Bonplandia,' three Englishmen were, on the 18th of August, elected Members of the Imperial L. C. Academy:—1. John Smith, Esq., who received the cognomen "Kunze." 2. Dr. Thomas Thomson, to whom the title "Hamilton" was given. And, 3. John Miers, Esq., on whom the name "Kunth" was conferred.

EDWARD NEWMAN, PRINTER, 9, DEVONSHIRE STREET, BISHOPSGATE.

APPENDIX

TO

THE ZOOLOGIST

For 185~~2~~3

Art. XXIX. — *Proposed Division of Neuroptera into two Classes.*

By Edward Newman.

Characters are assigned to groups in Natural History, for the purpose of distinguishing them from other groups. To accomplish this end, characters should apply to all the component parts of the groups which they are intended to distinguish, and should *not* apply to the component parts of any cognate group which they are not intended to distinguish. It is, however, no proof that a group is unnatural, because the characters which naturalists have assigned to it are insufficient; for the uninstructed mind acknowledges Nature's grouping, without the aid of science: an infant will distinguish a bird or a fish, without knowing the characters which separate both from a mammal; and however the man of science may blunder in defining those characters, however unsatisfactory to himself and to others may be his definitions, still a bird and a fish will ever be recognized as things distinct and separate from each other and from mammals. Nothing is more certain than that Nature has distinguished such groups: nothing is more probable than that man should fail in defining them. In Entomology, we have hit on distinguishing characters for most of the classes; but that which is now universally known by the name Neuroptera, and, by a few entomologists, by my proposed name of Anisomorpha, has defied all attempts at definition, except such vague and negative definition as depends on variation or absence of character. Moreover, the mind does not recognize Neuroptera as one of Nature's divisions. All our systematists have felt this deficiency, this difficulty; but instead of carefully revising the entire group, and endeavouring to re-arrange and harmonize its contents, they have cut off here and there a group which appeared to them peculiarly aberrant, thinking that they had thereby reduced the residue into a more homogeneous mass. Our most profound systematists have thus separated groups from the Neuroptera, and raised them to an equal rank with the heterogeneous residue, which they have left united. As instances I may mention De Geer, Fabricius, Dumeril, Kirby, MacLeay, Haliday, Brullé, Laporte Count de Castelnau, &c., who, under the names of Elinguia, Odontata, Stegoptera, Trichoptera, Megaloptera, Thysanoptera, Isoptera, Raphioptera, Anisoptera, &c., have separated one or other of the integral portions of the class. To criticise the labours of the men whose names I have here enumerated, would be altogether out of place in one who is proud to rank himself as their disciple; but it cannot be overlooked that the concurrent testimony of these profound and original thinkers is against the integrity or homogeneity of Neuroptera, although each has sought a different remedy for an evil equally manifest to all.

My own idea, broached many years ago, is, that the character of variety in structure and metamorphosis, which all have assigned to the Neuroptera, and which, for want of a better, I must leave attached to the Anisomorpha, is not only insufficient but unphilosophical; and though still at a loss to find satisfactory characters for the imago, I think there is no doubt that the varied metamorphosis affords the means of dividing the group into two good and equal divisions. That these divisions should not be of the same extent as the other classes of Tetraptera, indeed, that they should be more intimately related, and should possess a great and structural resemblance in the perfect state, appears to me in no way to militate against the necessity for their separation, but simply to establish their central position among Tetraptera, a subject which it is not the object of the present paper to discuss; neither do I consider it needful to explain away the addition of an eighth division to this important group, although I am thus setting aside, at least to all appearance, the prevalence of the number seven. The following formula is that which I now beg to offer to the notice of entomologists, as desirable to adopt in this division of Entomology.

INSECTA TETRAPTERA.

Pupa amorphous .... AMORPHA.
  Wings normal, scaly .... LEPIDOPTERA.
  Fore wings normal, hind wings abnormal, club-shaped .... DIPTERA.

Pupa necromorphous	NECROMORPHA.
Wings normal, naked	HYMENOPTERA.
Fore wings abnormal, coriaceous; hind wings normal, folded	COLEOPTERA.
Pupa isomorphous	ISOMORPHA.
Mouth mordent, with transversely moving jaws	ORTHOPTERA.
Mouth with its component parts setiform, fitted only for imbibing fluids	HEMIPTERA.
Pupa various	ANISOMORPHA.
Pupa isomorphous	NEUROPTERA.
Pupa necromorphous	STEGOPTERA.

The following additional characters of the two new classes are offered in further elucidation of their distinguishing differences; and it may be observed that they are subject to occasional exceptional modifications.

NEUROPTERA, *Newm.*, non *Linn.*

Larva hexapoda; *agilis;* mordens; Ephemeris, Agrionibus, Libellulis, Perlis, aquatica, rapax, entomophaga; Termitibus, Psocis, Thripibus, terrestris vel arborea, plerumquè phytophaga.

Pupa *propemodùm isomorpha;* hexapoda; *agilis; natat, currit, vorat.*

Imago *larvam plus minusve simulans;* alis 4 amplis, membraneis, *nudis,* paribus; Ephemeris, Agrionibus *erectis;* Libellulis *porrectis;* mandibulis corneis, plerumquè validis, mordentibus.

STEGOPTERA, *Newm.*, non *Dum.*

Larva hexapoda; *segnis;* mordens; Phryganeis, Corydalibus, aquatica, ?phytophaga; Myrmeleonibus, Hemerobiis terrestris vel arborea, rapax, entomophaga.

Pupa *necromorpha; pelliculo ligata; sine ore, sine motu; neque natat, nec currit; folliculo serico diù quiescit.*

Imago *larvam nullo modo simulans;* alis 4 amplis, membraneis, plerumquè hirsutis, paribus, *neque erectis, nec porrectis,* sed *convolutis aut decumbentibus,* corpus tegentibus, instar tecti; mandibulis plerumquè corneis, plerumquè mordentibus.

A few additional observations may serve still further to illustrate the differences between the two classes. In the first place, the metamorphosis is decidedly different: the pupa in the Neuroptera is uniformly locomotive and feeding, in the Stegoptera uniformly quiescent and incapable of feeding: the much-discussed exception in the instance of Raphidia ophiopsis is apparent, and not real; in this insect there is no cocoon, and the pupa inhabits exactly the same situations as the larva, namely, excavated passages in the decayed bark of trees; it moves after a fashion, but only in the same way that the pupa of a Hepialus or an Ægeria may be said to move; and in each of the three instances the character, as regards the tribe, is exceptional, and not distinctive. The pupa in the Neuroptera, on the contrary, is uniformly active and voracious, although not uniformly isomorphous; the squat toad-like pupa of the Libellulina being very unlike the elegant imago. Natural classification is tripod, and metamorphosis, alary structure and cibarian structure are the three legs on which it stands: to neglect metamorphosis, therefore, where so decidedly marked as in the present instance, were to undermine the entire edifice, and to endanger the stability of the building. The flight, again, in the typical Neuroptera is pre-eminently strong and long-continued, gradually failing in aberrant orders, and perhaps becoming totally extinct among the most aberrant of all, the Thripsina: in the Stegoptera the flight is generally of short duration, heavy, fluttering and laboured, and the more strongly marked the characters of the class, the more feeble are the powers of flight. Again, as to food: the conspicuous and numerically preponderating Libellulina in the Neuroptera are predaceous and voracious in an eminent degree; whereas the equally well marked and equally numerous Phryganeina, in the Stegoptera, not only are not predaceous, but are not known to take any food: and when we find the Stegoptera exhibiting a predaceous and raptorial structure, as in Raphidiina and Mantispina, such characters are associated with the assumption of other Neuropterous characters, as the nude, hyaline, glittering, and strongly reticulated character of the wings, and the nudity of the pupa. These considerations lead to the belief that the Neuroptera and Stegoptera are distinct but proximate classes. In addition to these observations, it seems desirable to explain that these classes, although bearing old names, are nevertheless totally new. I feel an absolutely insuperable objection to giving new names where old ones can by any ingenuity be made to answer the purpose; and although I take on myself the responsibility of the new combinations of groups, and of the present application of the names, I trust that entomologists will feel no difficulty in the mental connexion of the word Neuroptera with the dragon-flies, heretofore and still the type of the class, nor of the word Stegoptera, or "roof-winged," with the ant-lions and lace-wings, for which Dumeril originally intended it.

I now proceed to a more detailed account of the contents of the new classes: the divisions are so perfectly natural, that naturalists are already agreed on them, with a single exception; and they may be briefly expressed by the following formula.

Divisions of NEUROPTERA.

Larva and pupa aquatic, carnivorous: —	
Wings when at rest erect, meeting vertically over the back: —	
dissimilar, fore-wings large, hind wings small: tarsi 5-jointed	EPHEMERINA, *Newm.*
alike: tarsi 3-jointed	AGRIONINA, *Newm.*
Wings when at rest porrected horizontally: tarsi 3-jointed	LIBELLULINA, *Newm.*
Wings lying flat on the back: tarsi 3-jointed	PERLINA, *Newm.*
Larva and pupa terrestrial or arboreal, omnivorous or phytophagous: —	
Wings lying flat on the back, alike, reticulated: tarsi 4-jointed	TERMETINA, *Newm.*
Wings deflected over the abdomen, dissimilar; fore wings large, hind wings small: tarsi 3-jointed	PSOCINA, *Newm.*
Wings lying flat on the back, alike, fringed, without veins: tarsi 2-jointed	THRIPSINA, *Newm.*

Divisions of STEGOPTERA.

(Tarsi uniformly 5-jointed).

Larva subcortical or arboreal, supposed to be phytophagous: —	
Mouth prolonged into a beak	PANORPINA, *Newm.*
Mouth of ordinary form: —	
Fore-legs simple	RAPHIDIINA, *Newm.*
Fore-legs raptorial	MANTISPINA, *Newm.*
Larva aquatic, supposed to be phytophagous: —	
living in a case	PHRYGANEINA, *Newm.*
naked, natatory	CORYDALINA, *MacL.*
Larva terrestrial, insectivorous: —	
digging pitfalls for its prey	MYRMELEONINA, *M‘L.*
living on leaves and feeding on Aphides	HEMEROBIINA, *MacL.*

Characters of EPHEMERINA.

Larva aquatic, breathes by means of external gills, which also serve as organs of natatory locomotion: it has long filiform multiarticulate antennæ, corneous but small and feeble mandibles, long and strong legs, and three long filiform multiarticulate caudal setæ: it frequents the bottom of ponds, and especially of running streams, is fond of secreting itself under stones, and appears to feed on the decomposing organic matter which mingles so largely in the sediment of all waters.

Pupa similar to the larva in its forms, habits, and food; the rudiments of the wings are however very perceptible at the posterior angles of the wing-bearing segments: it attains its perfect state by a double ecdysis; after the first, the insect retains the soft silky pellicle which invests a great number of insects, and which, in all other cases, is shed with the pupa-case; but, although remaining in this pellicle, it assumes its final form, and (*mirabile dictu!*) acquires the power of flight: after a feeble flight the insect settles, and in the course of a few hours divests itself of the pellicle, and has then accomplished all its transformations.

Imago with very short 3-jointed antennæ, the terminal joint longest, and a mere seta: 3 ocelli: the mouth is so soft and fleshy as to become amorphous after death, and its component parts totally obliterated: Latreille and Savigny, our greatest cibarian entomologists, examined the mouth of these insects, and the former left descriptions, the latter figures, of its parts; but these do not correspond, and I confess to my own entire inability to verify their observations: the life of these insects being proverbially short, and spent almost entirely either at rest or on the wing, we may conclude that the imago does not feed, and hence, probably, the apparently imperfect development of the cibarian organs: the prothorax is atrophied: the wings are much reticulated with veins, and very unequal in size, the fore wings being ample, the hind small, and sometimes totally wanting; they are held perfectly erect, meeting over the back when the insect is at rest, like those of a butterfly: the flight is in the evening, and in company, like that of some gnats, rising and falling, and is remarkable for its extreme elegance: the wings appear to be moved only in rising, the insect floating downwards by its own weight, with motionless and semi-expanded wings: the legs are simple and slender, the fore-legs longer and porrected in the males: the abdomen terminates in long caudal multiarticulate setæ.

The following formula, founded on the researches of Dr. Leach, exhibits the characters by which these insects may be again readily subdivided.

Wings 4 : —	
Caudal setæ 2	Baetidæ, *Newman*.
Caudal setæ 3	Ephemeridæ, *Newman*.
Wings 2 : —	
Caudal setæ 3	Cœnidæ, *Newman*.
Caudal setæ 2	Cloeonidæ, *Newman*.

Characters of Agrionina.

Larva aquatic, breathing by means of an internal abdominal apparatus, which, like the internal gills of fishes, or the external gills of the Ephemerina, appears to possess the power of abstracting oxygen from water, which is subsequently expelled through the anal aperture with a jerk which propels the insect forward, and seems to constitute its only natatory movement, although it crawls on mud, stones, and the stems of aquatic plants: it has moderately long, filiform, 7-jointed antennæ, corneous mandibles, and a remarkable jointed and porrectile labium, with which it seizes the small aquatic animals which constitute its food: its body is long and linear, with six legs of moderate length, and three long flattened caudal appendages : it is carnivorous, and excessively voracious.

Pupa in figure, habits, and food *resembles the larva,* but possesses rudimentary wings.

Imago with short slender antennæ, usually but not constantly 7-jointed: *transverse hammer-shaped exserted head : round widely separated lateral eyes:* complete manducatory mouth: atrophied prothorax: *cylindrical abdomen:* four wings minutely reticulated *and all alike, their shortest diameter near the base, their longest diameter at three fourths of the distance from the base to the apex, the increase being uniform throughout, they are held above the body of the insect when at rest, meeting each other back to back*: legs simple and of uniform length, tarsi 3-jointed: they walk slowly and awkwardly, *fly feebly and heavily* in the sunshine, and *continue but a short time on the wing :* feed entirely on living insects : the tarsi are 3-jointed.

The Agrionina may be divided according to the subjoined formula.

Those in which the continuity of the costal margin of the wing is interrupted or broken near the base, and the costal cells between this break and the base have scarcely any transverse veins, ... Agrionidæ, *Newm.* non *Leach.*

Those in which the continuity of the costal margin of the wing is interrupted or broken at more than a third of the distance from the base towards the tip, and the costal cells between this break and the base have very numerous and regular transverse veins, ... Calepterycidæ, *Newm.*

Characters of Libellulina.

Larva aquatic, breathing by means of an internal abdominal apparatus, which appears to possess the power of abstracting oxygen from water, which is subsequently expelled through the anal aperture with a jerk; it has rather short filiform antennæ, corneous mandibles, and a jointed porrected labium; its body is rather robust, and gradually attenuated towards the caudal extremity, which is furnished with three flattened appendages: it is carnivorous and excessively voracious.

Pupa *in figure very unlike the larva, short, obese, and somewhat toad-like,* its wing-cases large and conspicuous, the abdomen turned up at the extremity, and furnished with short conical appendages: habits entirely aquatic, carnivorous, voracious.

Imago with very short and slender antennæ, transverse, *subglobose,* exserted *head generally occupied exclusively with the enormous approximate eyes,* and powerful, fully developed mouth, 3 ocelli, atrophied prothorax, elongate variously formed abdomen; 4 reticulated wings, nearly alike but not quite so, the *shortest diameter of the fore, and the longest diameter of the hind wings is near the base; all of them are porrected separately and horizontally when at rest,* and never meet back to back above the abdomen; their *flight is powerful, rapid, and enduring,* their lives are spent almost entirely on the wing, hawking for insects, especially over pools and in damp woods; they are excessively voracious and predatory, seizing their prey on the wing, and settling for the purpose of devouring it: their tarsi are 3-jointed.

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The following formula for dividing the Libellulina into groups, is proposed as provisional only; but being founded on the acute observations of Leach, Van der Linden, Charpentier, Selys de Longchamps, Rambur and Brullé, it may be considered as expressing the present state of our knowledge of these neglected but remarkably conspicuous and beautiful insects: they inhabit every part of the globe, and the number of species appears to be enormously large.

Labipalpi biarticulate: ocelli in a triangle: —
  Anal angle of hind wings rounded in both sexes .... Libellulidæ, *Newm.* non *Leach.*
  Anal angle of hind wings acute in ♂, rounded in ♀ .... Corduliadæ, *Newm.*
Labipalpi triarticulate: ocelli in a line: —
  Eyes contiguous .... Æschnidæ, *Newm.*
  Eyes separate .... Gomphidæ, *Newm.*

Obs. — It will be observed that this and the preceding group are new, having hitherto been united: but they seem to me distinctly separated, neither am I aware of any species or so-called genera occupying debateable ground between them.

Characters of Perlina.

Larva aquatic, breathing by external tufted branchiæ attached to the leg-bearing segments, with long filiform multiarticulate antennæ, strong corneous mordent mandibles, depressed body, broad flattened head, and two long multiarticulate caudal setæ: frequents the bottom of clear running streams, secreting itself under stones, and feeding indiscriminately on all minute aquatic animals.

Pupa closely resembling the larva in form, habits and food, the only conspicuous difference that obtains is the prolongation of the posterior angles of the wing-bearing segments into processes, evidently containing the future wings of the imago.

Imago with long filiform multiarticulate antennæ, corneous masticatory mandibles, broad flat head, distant hemispherical eyes, equally developed leg-bearing segments, 4 membranous recumbent but not deflected wings, nearly alike, the hind wings largest and having the greatest diameter at the base, where they are longitudinally folded: flight in the evening, laborious, almost invariably descending; feeds on insects.

Obs.—Almost every entomologist of eminence, and amongst them Geoffroy, Reaumur, Fabricius, Olivier, Latreille and MacLeay, have regarded this group as possessing the case-bearing larva and quiescent cocooned pupa of the Stegoptera; but my conclusions are drawn from long and pains-taking observations on the insects themselves, and are confirmed by the subsequent researches of the accurate Pictet: I cannot therefore doubt of their correctness.

The following formula expresses what we know of the subdivision of this group.

Imago breathing by external branchiæ as well as tracheæ .... PTERONARCIDÆ, *Newm.*
Imago breathing by tracheæ only:—
and has 2 caudal setæ .... PERLIDÆ, *Newm.*, non *Leach.*
and has no caudal setæ.......................... NEMOURIDÆ, *Newm.*

Characters of TERMITINA.

Larva and pupa terrestrial, active, hexapod, furnished with powerful mandibles: social, constructive, voracious, omnivorous.

Imago with moderately long moniliform antennæ, depressed head received in the prothorax, hemispherical small distant lateral eyes, strong corneous mandibles, fully developed and transverse prothorax, 4 long membranous wings of equal size and form, which when at rest are decumbent but not deflected, the hind pair not folded, abdomen with two minute caudal papillæ: flies slowly and laboriously, and rids itself of its wings before founding a new colony; some authors assert that the wings are articulated to the thoracic segments, and fall off spontaneously at the articulation; Mr. Davis asserts that he saw the insect *bite off* its own wings: tarsi 3- or 4-jointed.

Obs. 1.—These are the white ants, universally known by their extraordinary constructive instincts.

Obs. 2. *Relating to the present confusion of the states of larva and pupa.*—In social necromorphous insects, the Formicina for instance, we have commonly four kinds of imagines or adults, these are perfect males and females, and imperfect males and females; in these latter, the progress of development appears to have been arrested at a given point by a certain law of Nature, which seeks, in these instances, the well-being and preservation of the species, through the labours of the great mass of individuals, and consequently requires labourers devoted solely to the task: the two kinds of apterous individuals which perform the labours of an ants' nest, are clearly neither more nor less than, the smaller, imperfect males, the larger, imperfect females. Among social isomorphous insects, in which the general figure and character is preserved from the egg to the imago, and is little more than a gradually progressive development in size, accompanied by a slight modification in form after every ecdysis, we have strong reasons for believing that these four kinds of individuals differ even from the egg, thus giving us four kinds of larvæ, four kinds of pupæ, and four of imagines. Such being the *rationale* of the composition of a colony of white ants, such being a summary of what, by analogy, we are to look for in inspecting its individuals, there is no just cause for surprise, if when, by analogy, we may calculate on finding twelve kinds of individuals, we do actually discover six or eight; neither is it at all astonishing, that with these six or eight kinds of individuals we should be unable to pronounce immediately and with certainty on the states of each; that is, to say that such an individual is the larva of a perfect female, and such another the pupa of an imperfect male. Latreille tells us that he found individuals having what he supposed the rudiments of wings attached to the wing-bearing segments, and that he therefore thought himself at liberty to conclude that these were pupæ, and subsequent authors have regarded this matter as settled; but we cannot consider this a sufficient conclusion: in all probability the great majority, as in the Hymenopterous ants, never attain wings at all, and the pupæ of such apterous imagines consequently possess no rudiments of wings; hence it follows that Latreille had only discovered one of the forms of pupa, without settling which. The individuals called by the illustrious author "neuters," and which Smeathman graphically described as "soldiers," and Fabricius as "pupæ," and which appear to be as scarcely one in a hundred to the smaller individuals which perform the labours of the community, are probably imagines, both male and female, arrested like the working apterous Hymenopterous ants, while still imperfectly developed. We are in want of more entomological observations, and also more philosophical deductions, before these matters can be finally settled.

The Termitina appear to be capable of division into two minor groups, by the length of their wings and the joints of their tarsi, according to the following formula.

Wings greatly longer than the body: fore-legs simple: tarsi 4-jointed .... TERMITIDÆ, *Newm.* non *Leach.*

Wings no longer than the body: fore-legs dilated: tarsi 3-jointed .... EMBIADÆ, *Newm.*

Characters of PSOCINA.

Larva generally arboreal, with long setaceous multiarticulate antennæ, exserted head, hemispherical and widely distant eyes, corneous mandibles, narrow but distinct leg-bearing segments, obese ovate abdomen, with two caudal papillæ: found on the bark and leaves of trees, among dried plants in herbaria, on preserved specimens of insects, among old papers, &c., and feeds on these various substances.

Pupa resembling the larva in figure, habits, and food, but with rudimentary wings at the posterior angles of the wing-bearing segments.

Imago with the antennæ, mouth, and general figure of the larva and pupa, but a narrower prothorax and 4 wings, whereof the anterior pair are ample and variously veined, the hind wings are smaller, with fewer veins, and slightly folded longitudinally, the wings are recumbent and deflected, having something of that roof-like character which distinguishes the Stegoptera: the female lays her eggs on the leaves and bark of trees, and commonly spins a slight web over them by way of protection; they run with great celerity, fly rarely and awkwardly, and appear to feed on the same substances as the larva and pupa.

The whole of this group is at present comprised in the family .... PSOCIDÆ, *Leach.*

Characters of THRIPSINA.

Larva hexapod, fusiform, and slightly depressed, with inserted head, lateral and simple eyes, and an equal development of the leg-bearing segments: feeds on bark, leaves and flowers of plants.

Pupa resembling the larva in figure, habits, and food, it differs in its slower movements, in the less equal development of the leg-bearing segments, in having its antennæ bent back on the sides of its head, and in having its wings distinctly visible, attached in a rudimentary form to their respective segments.

Imago of the same general figure, habits, and food as the preceding states: the head is oblong, the eyes oval, lateral, distant, and placed very forward in the head; the ocelli are three, and placed between the eyes; the antennæ are moderately long, moniliform, and have six or seven very distinct joints: the head, which is lengthened in front, is bent back towards the prosternum, and is produced into somewhat of an obtuse rostrum; all the parts of the mouth are present, the mandibles being corneous, lengthened, acute, very slender, incurved at the apex, broad and somewhat swollen at the base; the palpi exhibit no peculiarities, and there is not the least trace of the part I have called "galea," and which is so conspicuous, various, and important in the Coleoptera and Orthoptera: the prothorax is largely developed, receiving the head; the meso- and metathorax are soldered together: the wings are four, membranous, almost veinless, exactly alike, and fringed with long silky hairs; the legs are moderately long and simple, the profemora sometimes incrassated, the tarsi 2-jointed, rather swollen and without claws. These insects are minute, and infest in countless thousands the blossoms of Dahlias, Fuchsias, and other cultivated plants, often entirely destroying their beauty: one species is particularly injurious to wheat in some seasons, but its ravages fortunately are not common. They are so abundant throughout the summer, that it is almost impossible to shake a flower of any kind over a sheet of white paper, without procuring them: they rarely fly, and their flight is laborious and of brief duration.

Obs. 1. — Mr. Haliday, whose invaluable and highly philosophical papers on Entomology, published in the 'Entomological Magazine,' stamp him as one of the first, if not the very first of living entomologists, regards the Linnean genus Thrips as a group of insects equivalent in its distinctness to Coleoptera, Lepidoptera, Diptera, &c., and assigns it the name of Thysanoptera: yet Mr. Walker, although no one is so thoroughly acquainted with Mr. Haliday's views, has associated these insects with the Homopterous Hemiptera. To differ from two authors so justly celebrated, would almost be tantamount to declaring myself in error, were it not that their views are so dissimilar; this circumstance may serve as an apology for differing from either, and therefore equally so for differing from both. It may at the same time be allowable to state, that although the observations of Haliday threw the first light, and a flood of light it was, on the structure and classification of these minute creatures, yet his materials were so limited, and so very much restricted geographically, that we are compelled to consider the study of the Thripsina as still in its infancy.

The following formula, copied from the fourth part of Mr. Walker's 'List of the Homopterous Insects in the British Museum,' exhibits the views entertained by Mr. Haliday of a systematic arrangement of these insects.

Terebra fœminis		
nulla:	Fam. 1.	TUBULIFERA.
ocelli		
tres, anticus distans	Gen. 1.	IDOLOTHRIPS.
tres, æquidistantes (aut obsoleti)	„ 2.	PHLŒOTHRIPS.
quadrivalvis acuta:	Fam. 2.	TEREBRANTIA.
incurva	Tr. 1.	STENOPTERA.
antennæ apice		
capillaceæ	Gen. 3.	HELIOTHRIPS.
stylatæ: abdomen		
tomentosum	„ 4.	SERICOTHRIPS.
subnudum	„ 5.	THRIPS.
antennæ apicula		
connata	Sub-gen. 1.	APTINOTHRIPS.
discreta; prothorax apice		
valde angustatus	„ 3.	CHIROTHRIPS.
parum attenuatus:		
abdomen dorso		
efoveolatum	„ 2.	LIMOTHRIPS.
seriatim foveolatum		
apicula pro ratione articuli 6ti		
brevis	„ 4.	THRIPS.
elongata	„ 5.	BELOTHRIPS.
recurva:	Tr. 2.	COLEOPTRATA.
antennæ		
articulis 9 discretis	Gen. 6.	MELANTHRIPS.
articulis 5 citra apiculam	„ 7.	ÆOLOTHRIPS.
alæ completæ	Sub-gen. 1.	COLEOTHRIPS.
alarum rudimenta tantum	„ 2.	ÆLEOTHRIPS.

Obs. 2.—I beg to offer the following reasons for placing the Thripsina in the class Neuroptera:—

First.—Those naturalists who either extend their systems to the whole of animated nature, or confine them to the typical group, the vertebrated animals, invariably seek to include all animals, however aberrant, in one or other of the primary divisions: we occasionally see much ingenuity exhibited in settling the question to which division an animal belongs; for instance, Ornithorhynchus, Lepidosiren, Pterodactylus, Deinotherium, Ichthyosaurus, have all afforded scope for argumentative writing in this way: entomologists would unhesitatingly have ranked these as primary groups of vertebrated animals, equivalent to mammals, birds, reptiles and fishes; but it seems to me that the general zoologists are right in considering to which established group such abnormal forms can be referred, rather than in creating new groups purposely to receive them. Applying the same reasoning to insects, I think we ought to inquire to what established entomological group an aberrant species or genus belongs, rather than to create a new group purposely for its reception. Assuming then that Thrips is referrible to an established group, we have next to consider to what group it is referrible.

Secondly.—The metamorphosis of Thrips is totally different from that of Lepidoptera, Diptera, Hymenoptera, Coleoptera, and Stegoptera; it agrees tolerably well with that of Orthoptera and Hemiptera, and is positively identical with what we know of that of the Perlina, Psocina, and Termetina among the Neuroptera.

Thirdly.—The structure of the mouth absolutely forbids its association with the Hemiptera or Orthoptera, but differs no more from that of Neuroptera, than those of the divisions of Neuroptera do among themselves: for instance, than the Perlina do from the Agrionina, the Psocina from the Perlina, the Ephemerina from all the rest: the mandibles, considered so anomalous, are almost exactly similar to those of Corydalis cornuta in the Stegoptera, which no one has ever attempted to separate from its congeners.

Fourthly.—The perfect similarity of the fore and hind wings in Thrips is characteristic of Neuroptera, and especially of the Agrionina and Termitina, and is totally at variance with what obtains in all other classes.

On these grounds I have no hesitation in expressing my decided conviction that the Thripsina form an integral part and a primary section of the Neuroptera.

Characters of PANORPINA.

Larva unknown.

Pupa necromorphous: a single individual (of Panorpa) has been figured by Stein in Weigmann's 'Archives.'

Imago with long, setaceous, many-jointed antennæ; lateral, distant, hemispherical eyes; and the head produced into a long, deflexed beak, bearing the mouth at the extremity, as in the Curculionina.

This group may be divided in accordance with the following formula.

Ocelli 3, placed in a triangle between the eyes, ... PANORPIDÆ, *Newm.*
Ocelli 0: —
  Wings porrected when at rest, greatly dissimilar, fore-wings ample, much reticulated, hind-wings lengthened to four times the length of the body, and perfectly linear .... NEMOPTERIDÆ, *Newm.*
  Wings when at rest deflexed, ample, reticulated, similar .... MEROPESIDÆ, *Newm.*
  Wings rudimentary only .... BOREIDÆ, *Steph.*

Obs. 1.—The Panorpidæ are divided into two genera, Panorpa and Bittacus; they are closely allied, but the latter is distinguishable at once by its greatly lengthened legs and wings.

Obs. 2.—The family Meropesidæ, founded on the genus Merope, is nearly allied to the Boreidæ, with which it would readily associate but for its ample and normal wings. It is a native of North America, and has the Stegopterous character of roof-like wings, which in the Panorpidæ and Nemopteridæ is not perceptible.

Characters of RAPHIDIINA.

Larva elongate, slow, much resembling in figure that of many Coleoptera, but having the meso- and metathorax more restricted: the mandibles are corneous and acutely toothed; the antennæ are very short and 3-jointed, and, together with the strong curved legs, exhibit many analogies with those of certain Coleoptera: it burrows in the dead bark of trees, never leaving the gallery which it excavates; hence it may be inferred that it feeds on the dead bark, but entomologists have concluded, from the structure of the mandibles, that it is carnivorous: if so, it is the only instance on record of a carnivorous larva forming galleries.

Pupa necromorphous: the antennæ reflected and immovable, but the legs distinct from the body, and said to be used in walking; having only seen it in spirits, I cannot confirm this: wings rudimental, but very apparent, folded over the hind legs, an arrangement which seems altogether opposed to the alleged power of walking: it changes in the galleries formed by the larvæ, and is not enveloped in a cocoon.

Imago with an ovate head narrowed behind, and long narrow prothorax, articulated loosely so as to admit of an easy snake-like motion of the head and neck, whence the specific name of *ophiopsis:* eyes hemispherical, lateral, very distant: antennæ filiform, many-jointed; mandibles strong, corneous, curved, and sharply toothed: meso- and metathorax short, transverse, much broader than the prothorax: abdomen soft, terminating, in the females, in a falciform ovipositor: legs simple, almost precisely resembling those of pseudo-tetramerous Coleoptera, the basal joint being long, the second very much shorter, the third deeply cleft and produced into two large lobes, the fourth very short and placed in the cleft, and the fifth moderately long and of ordinary form: not uncommon in dry woods, and supposed to feed on insects.

I am only acquainted with one genus, Raphidia, forming the family .... RAPHIDIADÆ, *Newm.*,
RAPHIDIIDÆ, *Leach.*

Characters of MANTISPINA.

Larva and pupa unknown.

Imago with short many-jointed antennæ, slightly thickened towards the tip; corneous acute curved mandibles; broad transverse head; distant hemispherical eyes, occupying nearly the whole of each lateral surface; long, narrowed, and often transversely furrowed prothorax; elongate raptorial fore-legs; broad transverse mesothorax; narrow transverse metathorax; large and conspicuous propodeon; simple middle and hind legs; soft, moderately long, slightly incrassated abdomen, unprovided with any processes at its extremity: wings alike, roof-like, transparent, glittering, beautifully reticulated, no portion of them folded.

These insects may at present be included in the single family,
MANTISPIDÆ, *Newm.*

Obs. — It remains a matter for future consideration, whether the Raphidiina and Mantispina should be united: to me there appear many points of resemblance between them, but others of decided difference; indeed, the more attentively the anatomy of Raphidia is studied, the more closely will it be found to approach the Coleoptera; while Mantispa, especially in its raptorial fore-legs, exhibits a like approach to the Mantina among the Orthoptera: this different tendency induces me to continue them separate.

Characters of MYRMELEONTINA.*

Larva short, obese, inactive, with a flat head and oval body; the antennæ are short and setiform; the mandibles long, toothed, and slightly curved, perfectly adapted to seizing their living insect prey; along the sides of the body are fasciculi of stiff bristles, amounting to a regular fringe in one of the families (Ascalaphidæ). These larvæ, under the familiar name of "ant-lions," or some equivalent for that term, have been celebrated in all ages for their instinctive habit of excavating pitfalls, in the shape of an inverted cone, at the bottom of which they lie concealed all but the mandibles, awaiting the arrival of their prey, which having once fallen over the side of the excavation, cannot maintain a footing on the light sand of which its sides are composed, but gradually descends (the sand giving way beneath its feet) to the very bottom, where it is seized by the rapacious larva lying in wait to receive it; its juices are sucked out, and the empty skin is thrown to a considerable distance by the muscular exertion of the ant-lion. The larva of Ascalaphus is not generally supposed to make an excavation, but it lies in wait amid sand or light earth, in the same manner as that of Myrmeleon: some few of the Myrmeleontes are also aberrant in this respect.

Pupa strictly necromorphous, bearing no resemblance to the larva, than which it is remarkably smaller, and the head and tail are bent towards each other, so as nearly to meet; in some of the species it is contained in a spherical cocoon of silk interspersed with grains of sand; in this it changes to the imago, and the head escaping first from the shell of the pupa, gnaws with its newly acquired mandibles a hole through the wall of the cocoon, through which the imago passes, leaving the shell of the pupa still projecting from the aperture: it is a common belief that the pupa gnaws this opening, but this is not the case, the pupa having no command whatever over its cibarian apparatus.

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* *Myrmecoleon*, and not *Myrmeleon*, ought certainly to have been the name of the genus; but I cannot agree with Burmeister in thinking we are at liberty to alter it: such a liberty would re-open questions long since supposed to be decided.

Imago without the slightest resemblance to the larva, and scarcely any to the pupa; its head is transverse, and its antennæ generally incrassated outwardly, although in some Myrmeleontes almost filiform; its mandibles are corneous, curved, and mordent; its body long, slender, and cylindrical; and its wings of uniform size and shape, and finely reticulated.

The contents of this group seem to be capable of subdivision in accordance with the following formula.

Antennæ abruptly capitate: —
  of nearly the same length as the wings,
    Eyes divided .... ASCALAPHIDÆ, *Newm.*
    Eyes undivided .... HAPLOGLENIIDÆ, *Newm.*
  of nearly the same length as the head, STILBOPTERICIDÆ, *Newm.*
Antennæ gradually clavate, short, ... MYRMELEONTIDÆ, *Nwm.*

Obs. 1. — The Ascalaphidæ are divided by M. Rambur into the genera Ascalaphus, Theleproctophylla, Puer, Bubo, Ulula, and Colobopterus: after a careful examination of the characters employed by this learned entomologist, I feel considerable hesitation in adopting them as indicative of more than specific differences. I may perhaps be pardoned for objecting also to names previously used in a sister science.

Obs. 2. — The Haplogleniidæ are divided by the same entomologist into the genera Byas, Haploglenius, and Azesia, the latter comprising but a single species, the Azesia Napoleo of Lefebvre, described and figured in Guérin's 'Magasin de Zool.' Ann. 1842, Ins. p. 92; but this very striking insect, truly the emperor of its tribe, had been previously described by myself, under the name of Stilbopteryx marginatus (see Ent. Mag. v. 399, under date of 1838), and the name had for three years been employed in all our collections: I have regarded it as forming a distinct group.

Obs. 3. — The Myrmeleontidæ are divided by Rambur into four genera, Palpares, Acanthoclisis, Myrmeleon, and Megistopus, and the genus Myrmeleon is again subdivided into fourteen sections.

Characters of HEMEROBIINA.

Larva long, flattened, with a rather flat head; short setiform antennæ; long, curved, large and distinct leg-bearing segments: it comes from a very peculiar egg, deposited by the parent on the leaves of trees, to which it is attached by a long foot-stalk: it feeds on Aphides, vast numbers of which it consumes, and hence has obtained the name of Aphis-lion.

Pupa strictly necromorphous, bearing some resemblance to the larva; the head and tail are bent towards each other, thus forming a sort of semicircle; it is inclosed in a nearly spherical silken cocoon, in which it remains motionless throughout the winter.

Imago bearing no resemblance to the larva, and very little to the pupa: it has a small transverse head, with distant hemispherical eyes, remarkable in the genus Chrysopa for their excessive golden brilliancy; moderately long, filiform, multiarticulate antennæ; acute, corneous, mordent mandibles; four ample, similar, beautifully reticulated wings; distinct prothorax; soft cylindrical body; and moderately long simple legs: they fly languidly and heavily; and when irritated or crushed, many of the species emit a most offensive odour.

The Hemerobiina may be divided into four principal groups, as expressed in the following formula.

Ocelli 3: —
  Wings long in proportion to their breadth, very much resembling the ant-lions' .... OSMYLIDÆ, *Newm.*
Ocelli 0: —
  Antennæ setaceous, labrum emarginate CHRYSOPIDÆ, *Newm.*
  Antennæ moniliform, labrum entire........ HEMEROBIIDÆ, *Nwm.*, non *Leach.*

In this division must also be placed a small and very singular insect, the Hemerobius parvulus of Vill. Ent. Linn., which is also the Phryganea alba of Fab. Ent. Syst., the Malacomyza lactea of Wesm. Bull. Acad., and the Coniopteryx Tineiformis of Haliday, in Curt. Brit. Ent. The larva is short and obese, very much like that of the ant-lion; it is apparently entomophagous, and when full-fed spins a spherical and perfectly white cocoon, which is generally attached to the bark of a tree: the pupa is perfectly quiescent, and, like the larva, short and obese: the imago has multiarticulate filiform antennæ, large lateral eyes, entire labrum, horny acute mandibles, a bifid lacinia to the maxillæ, long slender 5-jointed maxipalpi, a truncate labium, elongated approximate 3-jointed labipalpi, atrophied prothorax, four nearly equally-sized wings, the lower pair smallest, their nervures following the formula of Panorpa rather than of Hemerobius, and covered with a white powder: the legs simple, of moderate size, and the tarsi 5-jointed, with the penultimate joint bilobed. There are several specific names in addition to those mentioned above, as Aphidiformis, Psociformis, &c., but whether or not they represent species, I am quite unable to say. For this little group I propose the name of

CONIOPTERYCIDÆ, *Newm.*

Obs. 1.— The genus Psychopsis, at present consisting of the single species, Psychopsis mimica, a most lovely insect from New Holland, which has every appearance of the clear-winged Pieridæ among butterflies, must for the present be placed with the Hemerobiidæ.

Obs. 2. — Other forms of Hemerobiina remain to be characterized: it is possible that Aleyrodes may find its affinities with Coniopteryx rather than with Aphis.

Characters of CORYDALINA.

Larva hexapod, active, aquatic, with short slender antennæ, corneous toothed mordent mandibles, soft fleshy body, and a series of remarkable articulated false legs, a pair of which is attached, as in the larvæ of the Lepidoptera and the Tenthredinina, to each segment of the abdomen; these are evidently natatory organs, and although all authors seem to agree that they are also respiratory organs, like the external branchiæ of the Ephemerina, this must not be taken for granted: the appendages in the two groups are totally different; in the Corydalina being slender, cylindrical, quinque-articulate antennæform organs, without any external indication of respiratory functions: although aquatic, this larva is able to live out of water, remaining unchanged for a long time in its earthy cell, without any indication of that shrivelling which so quickly attends the respiratory apparatus of the Ephemerina, causing speedy death: that these organs are connected with respiration is quite possible, but the premises from which this inference has been drawn are insufficient: there is a single hairy caudal process.

Pupa strictly necromorphous, perfectly quiescent, but capable of some motion when touched or irritated, it changes in a spherical earthen cell, formed with care by the larva in the banks of streams; the head and tail are bent, probably like those of the two preceding groups, to accommodate the insect to the restricted limits of the cell.

Imago having scarcely any similarity to either larva or pupa, with transverse head, deeply received into the well-developed prothorax; the wings are nearly alike, recumbent, and deflected, numerously veined, but not finely reticulated, the hind-wings are longitudinally folded.

These insects appear further divisible in accordance with the following formula.

Ocelli 3 : —
- Body clothed with hair.......................... ITHONESIDÆ, *Newm.*
- Body naked : —
  - Antennæ simple .... CORYDALIDÆ, *Newm.*
  - Antennæ pectinated .... CHAULIODESIDÆ, *Nwm.*

Ocelli 0 .... SIALIDÆ, *Leach.*

Obs. 1.—The Ithonesidæ appear to be a numerous group, confined to New Holland. Ithone is the only genus described, but there are many species, and these very dissimilar, and likely to be generically subdivided when we become better acquainted with the entomological productions of the wonderful country in which they are found.

Obs. 2.—In this division must also be placed, at least provisionally, the curious Spanish insect, Dilar Nevadensis of Rambur, which has much the appearance of a Hemerobius, but the male has pectinated antennæ, and the female a very long exserted ovipositor: the antennæ of the male are rather longer than the body, and have twenty-six articulations, each of which is furnished with a single long branch at its extremity, these gradually increase in length from the base to the tenth articulation, and from this decrease to the tip. The mouth has not been examined, and the economy is entirely unknown. Not being able to associate this insect with any other division of the Corydalina, I propose to institute the division .... DILARIDÆ, *Newm.*

Characters of PHRYGANEINA.*

Larva aquatic, much resembling in figure that of the Lepidopterous genus Psyche; the head is small, without antennæ, and having corneous mordent mandibles; the leg-bearing segments are of equal development, and have a coriaceous skin; the legs are short; the abdominal segments are covered with a soft skin, and are inclosed in a case constructed of extraneous materials, after the manner of the genus Psyche and other *sackträgers* among the Lepidoptera: in this case they reside at the bottom of running streams; they feed principally on decaying leaves and other vegetable substances which fall into the water, but also, as proved by Pictet, on other aquatic larvæ: they are supposed to breathe by means of external abdominal filaments, which, in some of the species, are separate and very conspicuous, in others they are grouped in bundles, but their office is rather assumed than proved.

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* I think the name of the genus should have been *Phryganodes*, i. e., *consisting of fragments of twigs*, or *like a little bundle of dry twigs*, and the group would in that case have been *Phryganodeina:* the termination I have given I am aware is unclassical.

Pupa necromorphous: when arrived at its full growth, the larva spins, by means of an oval spinneret like that of the silk-worm, an open net across both ends of the case, and this allows the pupa, which possesses the same (supposed respiratory) filaments as the larva, to breathe by separating oxygen from the water which passes freely through the case; the posterior extremity is firmly attached to some stick, stone, or other substance, at the bottom of the stream: in figure the pupa closely resembles the imago, all its limbs being discernible: when the time arrives for its assuming the imago state, the mandibles are first liberated from their investing membrane, and with these it gnaws an opening in the net-work at the anterior extremity of the case, and its specific gravity being less than that of water, it soon emerges altogether from the case, and rising to the surface there floats, until propelled by the casualties of winds or currents to the shore, when, by means of its liberated fore-legs, it crawls up a twig, a blade of grass, a stone, or other convenient object, and there completes its metamorphosis.

Imago with small exserted head; very long, filiform, multiarticulate antennæ; distinct, lateral, hemispherical eyes; three epicranial ocelli; the palpi long, porrected, and conspicuous; the other cibarian organs mere rudiments; the prothorax atrophied; the wings dissimilar, almost revolute, of nearly equal size, the hind wings folded longitudinally; the legs long, the tibiæ spurred; the body and wings covered with hair, and the entire figure and habit resembling the Tineina amongst Lepidoptera: the flight is generally slow, in the evening, and for a short distance; the life short; the food none.

This group is the only one amongst the Stegoptera which has been thoroughly worked: the task has been admirably executed by M. Pictet, of Geneva. The following formula, although based on characters of the larva and pupa, is confirmed and supported by those of the imago.

Larva residing in a movable case, which is carried on its body as a snail carries its shell : —	
Case opening in a circle : —	
Thoracic segments rounded : —	
Supposed organs of respiration single, filamentous	PHRYGANEIDÆ, *Newm.*
Supposed organs of respiration in bundles : —	
Hind legs long	MYSTACIDIDÆ, *Newm.*
Hind legs short	SERICOSTOMIDÆ, *Steph.*
Thoracic segments with the front angles pointed	TRICHOSTOMIDÆ, *Newm.*
Case opening with a slit	HYDROPTILIDÆ, *Steph.*
Larva residing in a fixed case : —	
Pupa in a double envelope	RHYACOPHILIDÆ, *Steph.*
Pupa inclosed in a single envelope	HYDROPSYCHIDÆ, *Steph.*

From this analytical view of the contents of the two proposed classes, it results : —

1. That there is no difficulty in defining the limits of each, and no genera occupy debateable ground between them.

2. That there is no discrepancy in the numerical contents ; that is, that their divisions and subdivisions, as families, genera, and species, nearly correspond.

3. That in the distinctive characters laid down, that of metamorphosis is employed as imperative in all other instances in the science of Entomology, and therefore, that its employment as imperative in the present instance, is no innovation, nor any deviation from an accepted law of the science.

4. That the divisions flow naturally into each other as now arranged, whereas in all arrangements where the fourteen minor groups are treated as parts of a single major group, and arranged in accordance with structure only, there are perpetual violations of Nature : groups are approximated that have only a single character in common, and others dissevered that are all but identical.

Under such circumstances, I cannot entertain a doubt that the classes Neuroptera and Stegoptera will hereafter be received as essential component parts of all systems of Entomology.

EDWARD NEWMAN.

September, 1852.

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NATURAL HISTORY JOURNAL.

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Appendix to the 'Phytologist' for 1851.

SYNOPTICAL TABLE OF BRITISH FERNS.

By EDWARD NEWMAN.

THE publication of the new edition of the 'History of British Ferns' has been unavoidably delayed, owing to the time occupied in making the very elaborate engravings of the new species, and also in searching continental authorities for the purpose of ascertaining and properly arranging the synonymy. Both these objects have now been accomplished, and the technical portion of the work is published at *One Shilling*, under the above title.

It comprehends brief descriptions of the orders, families, genera, and species, and ample references to the authorities from which each name is derived.

When a species has received two or more specific names, the date of each is given; and from these it will frequently appear that the oldest name has not been *generally* followed, although it is unquestionable that the distinguished botanists who have adopted and thus popularized the more recent names, were not ignorant of the earlier ones, and have therefore obeyed some other law than the simple one of priority.

References to foreign works are given only when needful; but references to the undermentioned British works accompany each species; and it should be observed that the last edition is invariably quoted, unless it is otherwise expressed: this is done on the supposition that the last in every instance contains the matured views of the author, as regards nomenclature and specific limits.

Huds. Fl. Ang. Hudson's Flora Anglica.
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E. B. S. Supplement to English Botany.
Mack. Mackay's Flora Hibernica.
Newm. N. A., *F.* Newman, the Naturalists' Almanack and History of British Ferns.
Hook. and Arn. Hooker and Arnott's British Flora.
Bab. Babington's Manual.

The Italics show the manner in which the works are quoted.

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TO CONTRIBUTORS.

Mr. Hogan's corrections and additions to his paper on Coleoptera arrived after printing of that paper was completed: they may be incorporated, with others that m arrive, at the end of the Catalogue.

Mr. Gurney's additional note on the Nutcracker was also too late.

The following Contributions unavoidably stand over, as well as the double In for 1853: — from Jonathan Couch, Esq., F.L.S.; Walter Buchanan, Esq., F.L William Kirby, Esq.; E. H. Rodd, Esq.; the Rev. Joseph Greene; the Rev. A Smith.

Book received for Review. — 'Zoology of H.M.S. Herald,' Parts I. and II.

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